SEPTEMBER 30, 1937 FIRST AERO WEEKLY IN THE WORLD

FLIGHT

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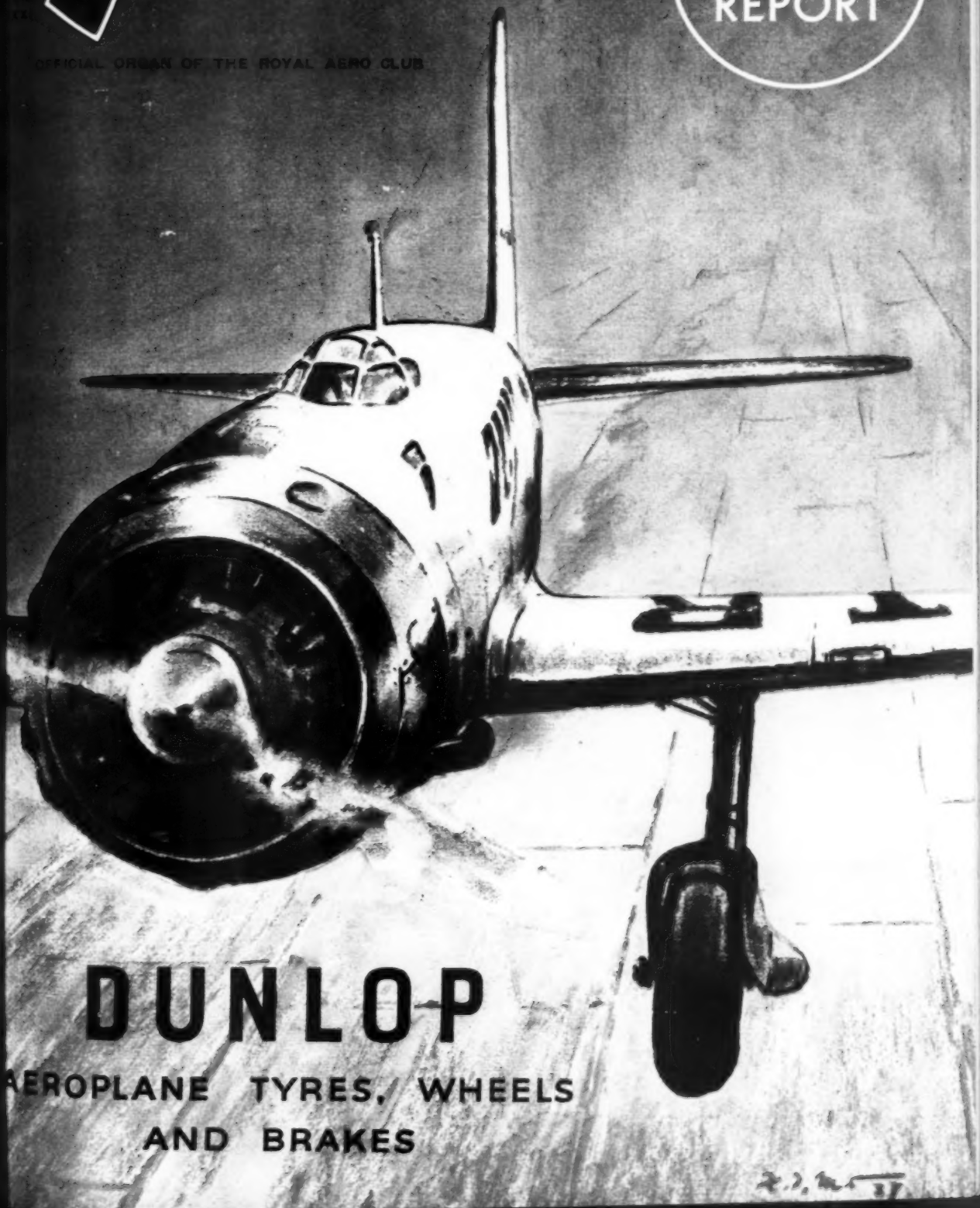
The AIRCRAFT ENGINEER AND AIRSHIPS

KING'S CUP REPORT

OFFICIAL ORGAN OF THE ROYAL AERO CLUB



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FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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Managing Editor G. GEOFFREY SMITH

Chief Photographer JOHN YOXALL

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King's Cup Reflections

THE race for the King's Cup, although its prospects before the start did not seem too rosy, turned out to be very successful in more than one respect. Never before has this race been won at a speed of over 200 m.p.h., and we may recall that it was only in 1925 that the Schneider Contest was won for the first time at more than that speed. The King's Cup is always a handicap race, but in these speedy times it is not fitting that it should be won by a very slow machine. In this year's race the minimum speed allowed for was 130 m.p.h. It would be more in keeping with the special character of the race and with the progress in aircraft design if next year that minimum were raised. The cup presented by His Majesty ought to go to a blood horse, not to a useful Suffolk Punch, though we have no intention of disparaging the performances of aeroplanes such as that which came in second on Saturday. The high speeds over such long courses attained by the two Mew Gulls flown by Capt. Percival and Mr. Gardner prove alike the quality of that type and the sterling abilities of both pilots.

There was nearly a dead heat for third place, and so it may almost be taken that the honours were shared by the first four machines home. Two of these machines were Percival products and the other two were designed by Mr. Miles. Both these gentlemen have joined the ranks of British designers in recent years, and both have made valuable contributions to our national supply of aircraft. Each has previously contributed one King's Cup winner, and this year they have between them secured the four first places. Both deserve congratulations.

When all is said and done, among the pilots Brigadier-General Lewin deserves the largest bouquet. If it had not happened, one would have thought it most unlikely, almost impossible, that a man of over sixty years of age should have led the field until very near the end, and then have been passed by only one of the really fast machines flown by a previous King's Cup winner. Most men who have won the Distinguished Service Order as well as other honours, and who have reached the rank of Brigadier-General and the age of 57, would be content to rest on their laurels unless called back to active service on the element which they know. Not so Gen. Lewin. He embarked on a new element, and though he had no previous experience of air racing (he carried an experienced pilot as navigator) he showed that he possesses all the qualities of a first-class racing pilot. What is more, as he lives in Kenya he introduced an Empire flavour into the race—for most people have now forgotten that Capt. Percival hails from Australia. We hope to see more Empire competitors enter their machines in future years.

Praise and Blame

Another big bouquet must go to the handicappers. Messrs. Dancy and Rowarth very nearly achieved the handicapper's dream of seeing all the competing machines come over the finishing line like a covey of partridges. With the desperate fighting finish for third place between Capt. Percival and Sqn. Ldr. Harvey one came to realise what a difference one second on a handicap may mean even at the end of 600 or 700 miles of flying.

The engine designers also have good cause to be satisfied with this race. The majority of the engines were De Havilland products, and all the seventeen starters on Saturday morning were relying on Gipsy engines. Of those, thirteen finished the course, while of the four who fell out only one was brought down by anything mechanically wrong with his engine.

As for the planning of the race, there congratulations must be more restrained. The best results are not obtained by omitting handicaps in the eliminating heat. *Flight* expressed its opinion on this arrangement in last week's issue, and most pilots who have experience of air racing have agreed with it. The first stage ought to be a handicap race, though, as was suggested above, the minimum speed allowed might with advantage be raised

It is quite right that the course for the King's Cup race should lie over the greater part of the British Isles, both for the purpose of testing navigating skill and also to let as many as possible of the King's subjects have a sight of the racing machines. This makes it necessary to fly the Irish Sea, and the degree of risk involved in crossing it at almost its narrowest point may be accepted for the sake of the advantages to be gained. But where there is no definite advantage in crossing water or very high ground these might be avoided so far as possible. The tragedy at Scarborough on Friday was no fault of the racing committee of the Royal Aero Club, but for the rest they may be accounted lucky that there were no other accidents. Had the weather been thick there might have been a different story to tell. It should not be difficult to arrange turning points so that crossings of the Wash, Morecambe Bay and other stretches of water could be avoided. Some pilots who felt sure of qualifying for the Saturday's race did fly round the coast instead of crossing the water, but that they should do so was not the idea of those who laid out the course. Hills covered in mist offer a much more definite and obvious risk, and we must remember that Mr. Warwick was killed in such circumstances. In fact, when clouds lie low over the hills along the course the race ought to be postponed, which would be a tremendous nuisance to everybody concerned. But one does not feel confident that the club would postpone a race even when the conditions made it wise to do so. In 1925 the mist lay low over the Chiltern Hills, and of the fifteen machines which started from Croydon six landed in the Chilterns and retired. On the second day there were only three starters, and the race became a fiasco. That year gave the late Capt. F. L. Barnard his second King's Cup win.

Needless to say, no one wants our greatest annual air race to be a cotton-wool affair, but we do not want avoidable tragedies. The Aero Club can test navigating abilities and endurance, as well as the quality of machines and engines, without forcing pilots into positions where extreme dangers may be met, dangers of a sort which even skill and experience cannot altogether counteract.

A Good Crowd

Finally it may be noted that, although there was no scurry round a small closed circuit on the second day, the crowd which assembled at Hatfield to watch the finish was certainly no smaller than in any of the years when the scurry has been held out as a great spectacular attraction. Judging by the eye, we should say that the crowd on Saturday was, if anything, larger than in most previous years. Still, the crowd was mostly composed of air people, not of the general public.

Only once before, and that nine years ago, has there been a fatal accident in a race for the King's Cup. In 1928 Mr. G. N. Warwick flew into a hill near Peebles in a mist. Since then the record of the great annual race has been clean until last Friday, when two competitors were killed in a most unusual accident at Scarborough, which is described on another page. *Flight* desires to offer its deep sympathy to the relations of Wing-Commanders Hilton and Sherren.

ZERO HOUR APPROACHES : The scene at Hatfield before the start of the King's Cup Race eliminating contest last Friday. Nearest the camera is Charles Gardner's blue 1936 model Percival Mew Gull which won the final at an average speed of 233.7 m.p.h.

The Outlook

A Running Commentary on Air Topics

The Little More . . .

"MANY private owners believe that racing is solely for those with unlimited free time and an inexhaustible banking account." So wrote Mr. Charles Gardner, the King's Cup winner, in his article, "Air Racing for the Amateur," which appeared in *Flight* of March 18 last. He then went on to show how that belief was unfounded, mentioning in turn the many small points in connection with machine preparation, navigation, etc., to which he attributes his successes.

One re-reads the article and thinks how simple it all sounds. Yet anyone who knows Charles Gardner and is also honest with himself realises that there are few pilots who can remember so much detail and apply it as methodically as he.

Undoubtedly, the secrets of his success are very largely care and system. As an example, from this year's race, Gardner found just thirty r.p.m. to be missing near Baldonnell. A change of plugs, a checking of valve clearances and a cleaning of magneto contacts found the missing revs before the pilot retired to bed. Others would have done without the odd few. Again, after the buffeting of Friday's course, Gardner and Henshaw swung their compasses and found a degree or so of inaccuracy. Undoubtedly, it is these small attentions which lead to success.

"Composphere" Flying?

ARGUMENTS in flying circles are apt to grow quite heated on the subject of assisted take-offs. It seems to be generally agreed that, as *Flight* pointed out some time ago, this will certainly be the next great step towards commercial flying with remunerative pay-loads over long distances. But there is by no means unanimity when it comes to discussing the relative advantages of the catapult and the Short-Mayo composite aircraft. Most discussions seem to run on the lines "catapult *or* composite"? *Flight* believes this to be fundamentally wrong, and that the answer will, in the future, be found to be "catapult *and* composite." We believe there will be room for both, each having certain advantages for certain conditions.

In addition to the advantages of high-wing loading, the change in design which will make assisted take-off necessary, there is a considerable gain in cruising speed to be obtained by flying high. America, France and Germany have been devoting much time and not a little money to research into the problems connected with stratosphere flying. The results indicate that there are no very great difficulties in providing the air-tight or, as the Americans term it, "pressurized" cabin. Keeping it air-tight does not appear to involve any very serious addition in weight, and the plant for maintaining the necessary pressure, which can be regarded as a form of supercharging of the cabin, is not, it seems, prohibitively heavy, nor are the effects on the occupants serious if the cabin springs even a fairly considerable leak. In other words, the physical discomfort from the rapid loss of pressure, comparable with those of a phenomenally rapid rate of climb, is nothing like as great as that which results from a too-rapid descent.

It is beginning to appear that the really difficult problems of stratosphere flying may be connected with the aircraft itself, and more particularly with its engines. If the operational height is to be between 30,000 and 40,000 ft., the supercharging problems become serious. Two-stage or even three-stage blowers become necessary, introducing weight and complications such as inter-stage coolers.

Sharing the Work

A FEW moments' reflection will show that fundamental principles indicate that the idea of the composite aircraft might be applied with great advantage to solving the problems of stratosphere flying. Both have as their main objective the increase in cruising speed over long ranges while carrying a reasonable pay-load, and they do appear to work together very well, unless some unforeseen difficulty renders faulty an argument based on fundamental principles.

It seems reasonable to suppose that it should be possible so to select the degree of supercharging of the engines of upper and lower components of the composite that from sea level to 20,000 ft., for instance, the engines of the lower component would do most of the work, and would be supercharged for medium altitudes.

The engines of the upper component would be very highly supercharged, and as height was gained during the climb they would be able to take over more and more of the work, their power increasing as that of the lower component's engines decreased.

In this way the "sea level" of the engines of the upper component might be raised to, for the sake of argument, 20,000 ft., and their superchargers would therefore only have to cover an altitude range of some 20,000 ft., instead of the full 40,000 ft. range demanded if the engines of a single stratosphere aircraft were to do all the work.

Should such an arrangement be possible (and we shall be glad to hear what readers think), there would be one field in which the composite would score over the catapult. We do not doubt that there are some conditions in which the catapult would provide the better solution. As we have said, we believe the future will show that there is room for both.

Aircraft and Sea Tactics

IT is commonly said that aircraft are a weapon of offence and of only minor powers in defence. It is, therefore, interesting to note that in a book on naval strategy and tactics* the author gives two cases in which he asserts that "the effect of the air is very much in favour of the defence." One of these cases is that of troops trying to land on an enemy's coast. The shore-based aircraft, writes Commander Grenfell, would surely be superior to those which the hostile fleet brought with it, and consequently the landing parties would have a poor time. He concludes that "the defence of a country against overseas invasion might be adequately conducted by the air forces alone." It should be noted that in this case the home aircraft are strategically defensive but tactically aggressive. The other case is that of a stronger fleet trying to bomb a weaker one out of its defended harbour. The admiral of the stronger fleet can presumably only use ship-borne aircraft, which means that he would have to bring his carriers within range of the enemy's shore-based machines, to say nothing of his submarines. Again the defence appears stronger than the attack.

Shore-based aircraft are limited in range, but within that range Commander Grenfell seems to have great respect for them. Their power when used against warships is, he agrees, unknown, and will probably remain unknown until the next war. But he doubts whether any admiral will care to expose his big ships to air attack.

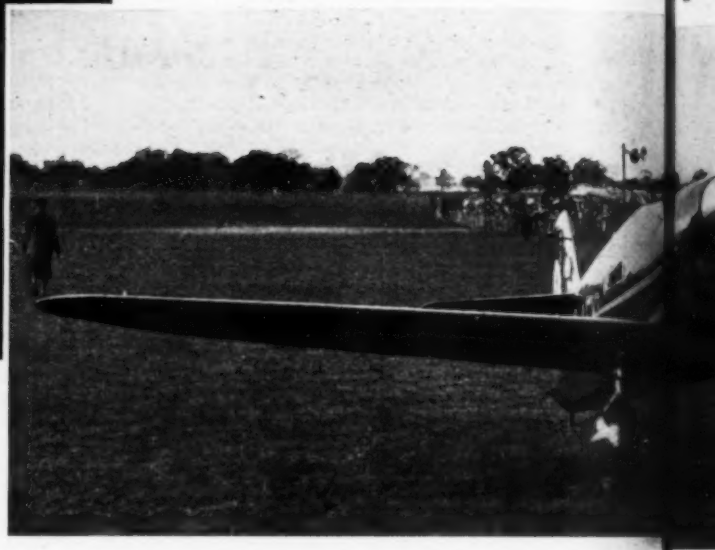
* *The Art of the Admiral.* By Commander Russell Grenfell (Faber and Faber, 12s. 6d.).

DIARY OF FORTHCOMING EVENTS—PAGE 293

THE SIXTEENTH KI

Charles Gardner, Flying a Percival Me ull v
Wins for the Second Year in Succession apt.
Nearly 240 m.p.h. : High Winds Bring Go isibi
(Reports by "Flight" Representatives nglan

Charles Gardner receives the King's Cup from Lord Swinton. (*Flight* photograph.)



FOR the second year in succession Mr. Charles Gardner has won the King's Cup. Last year he flew a Percival Vega Gull; this year he flew the much faster Mew Gull (Gipsy Six Series II), of which he is the owner. He flew the 786.6-mile course of last Friday's Eliminating Contest at an average speed of 213.8 m.p.h., and in the Final on Saturday he averaged the very excellent speed of 233.7 m.p.h. Gardner, who is 25 years of age, is the owner of two aircraft, which he keeps at his own private aerodrome.

The runner-up, by the close margin of 2m. 27s., was Brig.-Gen. A. C. Lewin, piloting a Miles Whitney Straight (Gipsy Major), with Sqn.-Ldr. de St. Leger as navigator. He averaged 144.5 m.p.h. in the Final. As Lord Swinton said when presenting the prizes, this entry added an Empire flavour to the race, for Brig.-Gen. Lewin lives in Kenya. A private owner since he learned to fly six years ago, the General is 63 years of age, and has never previously competed in an air race, which makes his effort all the more meritorious.

Fastest Time

Third was Capt. Edgar Percival, constructor of the Mew Gull, flying another of these machines (with Gipsy Six Series II engine), and recording the startling speeds of 225.2 m.p.h. in the Eliminating Race and 238.7 m.p.h. in the Final—the highest actual speeds on both days. He finished only six seconds behind Brig.-Gen. Lewin, and was practically neck-and-neck with the fourth man, Sqn. Ldr. A. V. Harvey, in a Miles Whitney Straight—only three-fifths of a second separated them. The finish as a whole was one for which the handicappers deserve the warmest congratulation.

The route took competitors over England, Scotland, Northern Ireland, the Irish Free State and Wales. Friday's Eliminating Course, starting from Hatfield, ran via Cambridge, Skegness, York, Scarborough, Whitby, Newcastle, Edinburgh, Aberdeen, Glasgow, Portpatrick and Newtownards to Dublin, a distance, as already stated, of 786 miles. On Saturday, in the Final, the competitors travelled from Dublin, via Newtownards, Portpatrick, Carlisle, St. Bee's Head, Blackpool, Stoke-on-Trent, Leicester, and Cardiff to Hatfield, a total of 656.2 miles.

On both days there was a high and gusty wind which, while it ensured good visibility, made the going very difficult for the competitors, and it is believed to have been the direct cause of a fatal accident which marred the race. This was on Friday, when the Miles Falcon, flown by Wing-Cmdr. E. G. Hilton and Wing-Cmdr. Sherren, crashed at the Scarborough turning point.

Brig.-Gen. Lewin, who was second in his Miles Whitney Straight, receives the congratulations of his friends. In the centre, smiling, is his navigator, Sqn. Ldr. R. J. M. de St. Leger. (*Flight* photograph).

PREPARATIONS

COMPETING machines had to be at Hatfield by noon on Thursday. The weather during the morning was grey and overcast and threatened to get worse. Most of the entries turned up, and by the time the hour of grace expired all had arrived and were on the line, with the exception of the new Miles Hobby, the Moss monoplane, the Vega Gull entered by Tonge, and one of the two B.A. Double Eagles (the Major-engined version). The remaining 27 machines were duly lined up in two rows for inspection by the handicappers.

By an extraordinary coincidence both Rowarth and Dancy were stricken down, Rowarth with pleurisy and Dancy with a

H KING'S CUP RACE

ull with D.H. Gipsy Six Series II Engine, apt. E. W. Percival (Mew Gull) Averages isibility but Uncomfortable Travelling: ngland, Scotland, Wales and Ireland)

This year a score-board at Hatfield indicated the competitors' progress around the course. It was efficiently operated by Boy Scouts. (*Flight* photograph.)

(Above) Gardner's victorious Mew Gull being led in after the finish at Hatfield. (*Flight* photograph.)

Capt. Percival chatting with Lord Swinton.

(Below) Capt. Percival's Mew Gull, which finished third in the final and which made the fastest actual speed on both days. (*Flight* photograph).

THE PRIZE-WINNERS

THE KING'S CUP (presented by His Majesty the King)—Charles Gardner, Percival Mew Gull (Gipsy Six Series II).

Cash Prizes

(PRESENTED BY LORD WAKEFIELD OF HYTHE)

1st. £1,000.—Charles Gardner.

2nd. £350.—Brig.-Gen. A. C. Lewin, C.B.E., C.M.G., D.S.O., A.D.C., Miles Whitney Straight. (Gipsy Major).

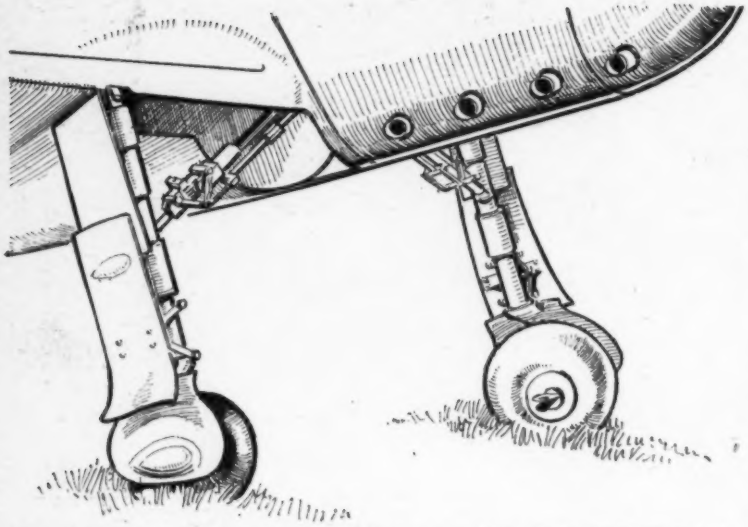
3rd. £150.—Capt. E. W. Percival, Percival Mew Gull (Gipsy Six Series II).

FASTEST TIME IN ELIMINATING CONTEST, CLASS A, under 150 h.p. (£200).—R. J. Waight, T.K. 4 (Gipsy Major II). Second Fastest (£50).—F/O. G. R. de Havilland, T.K. 2. (Gipsy Major, H.C.)

FASTEST TIME IN ELIMINATING CONTEST, CLASS B, over 150 h.p. (£200).—Capt. E. W. Percival. Second Fastest (£50).—Charles Gardner.

ruptured ligament in his foot, sustained while playing golf. Rowarth was in bed and unable to be present, although we are glad to learn that he is progressing as well as can be expected. Dancy turned up, and, with the aid of a stick and a crutch, was able to hobble about. Cynics, of course, had it that the two handicappers were afraid of facing infuriated competitors ! By a stroke of good luck Captain Goodman Crouch was available (he and Dancy started the handicapping racket together many years ago, it will be remembered) and he stepped into the breach, aided and abetted by Eric Lord.

When, in the early afternoon, the rain became entirely unbearable, it was very wisely decided that the machines could be taken into one of the De Havilland erecting shops (whither they might well have been taken much earlier) in order to make the life of scrutineers and competitors a little less miserable, and for the rest of the



The makers of the Dowty undercarriage have co-operated with the D.H. Technical School students in the design of the inward hingeing retractable legs of the T.K.4.

afternoon Dancy's crutch and slide rule did without water-cooling, while Crouch's tape measure regained its original length.

One unexpected advantage of bringing the machines into the erecting shop was ingeniously made use of by the scrutineers. The water dripping off the wings of the machines made a nice little dotted outline on the concrete floor, from which such things as span and chord could be very readily measured!

THE START

FRIDAY morning provided very different weather. The sun was shining and the weather reports, although mentioning ground mist and northerly winds, also indicated that the clouds were at a considerable height and had a goodish number of openings in them. Icing conditions at 5,000 ft. were mentioned, to be sure, but it was hoped that by the time it might become necessary to go to that height (over the Scottish hills) the sun would be higher and the icing danger might have disappeared.

With the wind blowing from almost due north, the machines were lined up in three rows in the south-west corner of Hatfield aerodrome. This meant that they were almost "on their course," or, at least, that only a relatively small right turn had to be made to get there. As it turned out, some of the competitors made their turn after getting into the air, but quite a few chanced a slightly cross-wind take-off and pointed their noses straight at Cambridge, the first turning point. The actual run to take off was slightly uphill, and some of the machines seemed a bit sluggish in accelerating during the first 150 yards or so of their run.

In order to prevent overtaking, should the weather have been thick, and to prevent crowding at the controls, the machines were started off, at intervals of 30 seconds, almost in the order of their speeds, the fastest being sent off first.

Waight in the T.K.4 was first away, and was followed by Percival, the others following roughly in the order of their racing numbers, which had, apparently, been allotted by guesswork originally, it being fairly obvious which machines were fast and which were slow.

First Away

The T.K.4 took a fairly long run, as had been expected, but once in the air Waight quickly tucked its legs up, first the right and then the left. Percival waved a cheery good-bye as friend Reynolds dropped his green flag, and did not seem in any desperate hurry about anything, although he was later found to have "cruised" at a comfortable 218 m.p.h. on his way to Newcastle. The smile had been in evidence all Thursday, and one felt that Percival considered Rowarth and Dancy a pair of thoroughly good chaps.

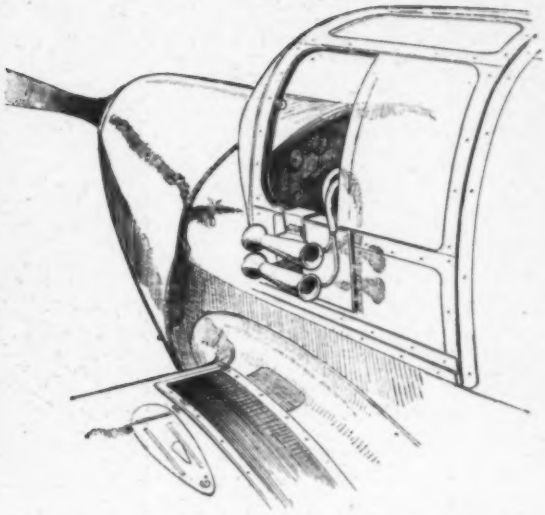
Charles Gardner, third man away, was the first to start the "on-your-course" fashion, and several followed his example. The wind was, in any case, not very strong, and the up-hill slope was slightly less pronounced that way.

Everyone got away on the drop of the flag until it became the turn of Miss Dillon and Stack. Their Vega Gull gathered speed very slowly and finally turned left, out of the line of starts, and taxied back. It was found that the plugs had oiled up, presumably as a result of running the engine throttled for a considerable period before the start. Matters were soon put right, but No. 13 had to wait until all the others were away before being allowed to proceed. That cost Stack something like nine minutes.

Giles Guthrie carried Sqn. Ldr. Swain as navigator, but neither wore pressure suits, and it was not thought that they

A Triton among the minnows : Piper's Short Scion Senior ready to leave the line on Friday. The next machine is Brig.-Gen. Lewin's Miles Whitney Straight, which finished second. (*Flight* photograph.)

A handicapper handicapped : Capt. Dancy, suffering from an injured foot, does a little scrutineering. He is examining the Miles Whitney Straight of Brig.-Gen. Lewin, who is seen with him. (*Flight* photograph).



What they were looking at—two special venturi tubes which, when power for blind-flying instruments was required, could be clamped outside the window of the Whitney Straight.

intended to do the Eliminating Trial at 50,000 ft.

By way of a change from organising international air freights, Capt. W. L. Hope took the controls of McCarthy's B.A. Eagle, a fact which caused an onlooker to remark that while there is a King's Cup there is Hope.

As this was its first appearance in a major race, the take-off of the Wicko monoplane with Cirrus Major engine was watched with interest. The machine got away very well indeed, and no one would suspect, from the way it was handled, that Flt. Lt. H. R. A. Edwards had never seen the machine until the previous Thursday.

THE STORY OF THE RACE

WELL, the prophets were wrong, ourselves included. By an amazing piece of luck the weather was consistently fine over the course and the visibility was good during the two days of the race. Had this been held at almost any time during the previous three weeks there would have been serious trouble over one part of the route or another. As it was the forecast for last Friday promised a gusty wind of 30 m.p.h. or so and occasional showers on the East Coast and in Scotland, with a cloud base staying above 2,000 ft.; Saturday's was similar, with rather higher winds, and it was only in eastern England (not touched by the competitors) that rain was due and the clouds were likely to cover the higher ground.

In exchange for consistent visibility of the twenty-mile order, the competitors suffered buffeting of a severity which has rarely, if ever, been experienced in a race. Bumps of shattering intensity were met at all altitudes and particularly while flying low for the turns. Along the East Coast between Skegness and Newcastle those pilots who were not held rigidly in Sutton harness found it necessary to hold themselves down with one hand while fighting their machines with the other. Damaged heads and broken seats and roof coverings were almost too numerous to be remarked upon, though only two arrivals at Dublin, W. L. Hope and H. L. Piper, showed visible evidence of the personal damage. Several pilots had bruised and blistered stick hands at the end of the first long day. It seemed that everywhere there was an unrighteous combination of plain dynamic and thermal up- and down-currents.

At Scarborough

The most universally shattering of these bumps were found at or near the Scarborough Castle turn, and it was here, of course, that the race suffered its one tragedy. All the pilots spoke of the way in which their machines had become momentarily uncontrollable at this point, and it was the fate of one to suffer a quite impossible shock as it flew into the violent downdraught on the south side. So great was the shock that Wing Cmdr. Hilton was actually flung out of the machine and Wing Cmdr. Sherren lost his life when it crashed.

Judging from the way in which the majority of the machines were flung helplessly about the sky and sometimes down again to within a few feet of the sea beyond the Castle, it may be said that only good flying and good luck prevented a recurrence of disaster. It was here that H. L. Piper lost two ballast bricks through the floor of his Short Scion Senior; that Sqn. Ldr. A. V. Harvey broke the seat of his Miles Whitney Straight; that C. H. Willis's co-pilot, W. C. Potter, in the B.A. Eagle, was knocked more or less out; and that Capt. W. L. Hope, flying alone in another Eagle, was also momentarily stunned—to describe but a few of the many fearful moments. Even those who were held more firmly in their machines must have suffered the extremity of acceleration effects, though they, at least, found less difficulty in retaining control. Racing rules should specify the use of aerobatic harness, it seems.

Official time : Capt. Percival checks his watch with Timekeepers George Reynolds and F. R. G. Spikins. (*Flight* photograph).

So far as the faster pilots were concerned the eliminating contest tended to lose interest, though the "possibles" had to squeeze every ounce out of their machines and fly very accurate courses if they could hope to reach the final. Capt. Percival, for instance, knew just how quickly he had to fly the new Mew Gull in order to obtain the fastest time in the "B" class, but he could not afford to loiter with Gardner and Henshaw on his heels. Waight, on the other hand, had almost 50 m.p.h. in hand on Wing Cdr. Stent's Sparrowhawk and G. de Havilland's T.K.2. Consequently he plotted a bad-weather non-swimmer's course on Friday, flying round the Wash, along the coast past Middlesbrough, round the Cheviots by St. Abb's Head, and so forth; even so he averaged 207 m.p.h.—which, on 140 h.p., is remarkably good going, and savours of the death or glory racing machines at Cleveland, Ohio.

Early Retirements

As it happened, there were so many retirements in the "A" class that everyone who got through competed in the final. Flt. Lt. H. R. A. Edwards, with the Wicko, was the first to go; he forced landed at Skegness. Then E. J. Jobling-Purser forced landed his Whitney Straight with fuel shortage near Newcastle. Both C. S. Napier (Hendy 302) and Sqn. Ldr. E. C. T. Edwards (Miles Magister) dropped out at Edinburgh; and S. T. Lowe (Comper Swift) at Renfrew. That left nine for the final—and only nine could reach it, anyway.

It was in the "B" class that the unfairness of the method of elimination was so pronounced. Every starter got through to Baldonnell and out of the twelve only eight could enter the final. This, on paper, and before the flag had dropped at Hatfield, meant that three of the five Vega Gulls and the Short Scion Senior had no chance at all, yet, on a basis of its handicap speed, the Scion alone probably had a better chance of winning than any other machine in the race. Piper's only hope was that bad weather would slow down some of the other entrants or that, while his four Niagara IIIs kept on running at 3,800 r.p.m., other engines would fade out. An average of 135 m.p.h. over the 787 miles was of no avail. The lucky Vega Gulls were those flown by Derek Schreiber (co-pilot Flt. Lt. Peel) and Giles Guthrie (co-pilot Sqn. Ldr. F. R. D. Swain of height record fame). Miss Dillon and Capt. Stack's fourteen-minute plug-trouble hold-up at Hatfield made no difference to the result, though their Vega would then have been less than two minutes outside the limit made by Guthrie, the last finalist to come home.

In spite of the large aggregate amount of sea-crossing, very few competitors took the precaution of wearing life-saving jackets. Derek Schreiber (right) and Flt.-Lt. Peel, his navigator, were among the exceptions. (*Flight* photograph.)

Apart from the aforementioned bumps the greatest difficulty for the faster men on each day's racing was that of deciding exactly how little fuel need be taken aboard at the different controls where the take-off run was limited. More than once Waight found that he was only just staggering out of small aerodromes such as Newtownards (the run there is only 600 yards) and even at Cardiff the T.K.4's wheels were still brushing the turf as he passed between two marker boards. The use of such a course certainly limits the ultimate possibilities in the way of wing-loading and, consequently, of top speed, even with v.p. airscrews. Waight's engine, incidentally, uses about nine gallons an hour at full throttle, while the Mews use about twenty—and every ounce counts.

For comparative purposes it is not very useful to describe the changing order during the eliminating race, though the speeds given in the table on this page are, in some cases, quite interesting. Quite apart from the slowing effect of the bumps and the fact that the competitors had more head-wind than tail-wind with which to cope, the faster machines had often to be throttled right back to conserve the structure during the more devastating onslaughts. However, it was an interesting sidelight on the speed of the modern racing machine that, leaving Hatfield in a Dragon with Mr. Henshaw, sen., an hour and a half after the first man, clearing Customs at Liverpool and flying straight across, we should find that three machines had already arrived at Baldonnell.

In Dublin

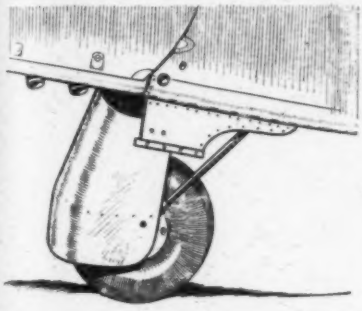
Here the proceedings were in the hands of the Irish Aero Club, ably assisted by Irish Air Force personnel, with Major Goodfellow and Mr. Ashwell-Cooke to look after things generally. In fact, everything was done extremely well, with field telephones and what not, and the corrected arrival times were broadcast almost as the machines made their landing circuits. A hearty ridge near the south-east boundary provided the only excitements, though A. H. Hole, flying Mr. Lindsay Everard's Vega Gull, failed to cross the line correctly and was told to take off again and do it properly. He had come in (from the wrong direction) neck-and-neck with Butler in another Vega, but the latter—or rather, his co-pilot Morris—had realised that the line still remained uncrossed and had made a rapid right-hand circuit to rectify the matter.

In the evening the competitors and others were entertained to dinner by the Irish Aero Club, and though, probably for political reasons, there were to have been no speeches, some *were* made—with or without the support of the chairman and the diners. The performers were: Mr. O'hUadhigh, chairman and president of the I.A.C. (official demand); Col. Russell (unofficial and interrupted, de-

THE ELIMINATING CONTEST.

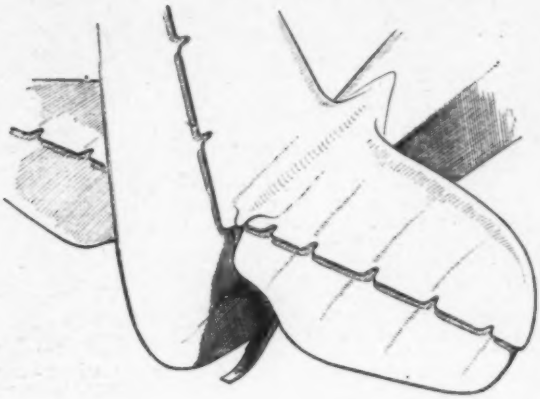
No.	Pilot.	Aircraft and Engine.	Average, m.p.h.
		CLASS "A."	
30	Willis...	B.A. Eagle (Gipsy Major I)	128.4
27	Jobling-Purser ...	Whitney Straight (Gipsy Major I)	Retired Newcastle.
26	Harvey	Whitney Straight (Gipsy Major I)	132.3
24	Hilton	Miles Falcon (Gipsy Major I)	Crashed Scarborough.
25	Lewin	Whitney Straight (Gipsy Major I)	130.2
22	Napier	Hendy 302 (Cirrus Major)	Retired Edinburgh.
21	Hope	B.A. Eagle (Gipsy Major I)	124.7
23	E. C. T. Edwards ...	Miles Magister (Cirrus Major)	Retired Edinburgh.
20	Lowe	Comper Swift (Pobjoy Niagara III)	Retired Glasgow.
28	Hughesdon	C. W. A. Cygnet (Gipsy Major I)	125.5
29	H. R. A. Edwards ...	Wicko (Cirrus Major)	Retired Skegness.
18	Atcherley	Comper Swift (Gipsy III)	127.3
10	Stent	Miles Sparrowhawk (Gipsy Major I)	151.2
9	De Havilland ...	T.K.2 (Gipsy Major, H.C.)	165
1	Waight	T.K.4 (Gipsy Major II)	206.7
		CLASS "B."	
19	Piper	Scion Senior (4 Pobjoy Niagara III)	Eliminated.
16	Hole	Percival Vega Gull (Gipsy Six I)	Eliminated.
15	Schreiber	Percival Vega Gull (Gipsy Six II)	159.4
13	Stack...	Percival Vega Gull (Gipsy Six II)	Eliminated.
12	Guthrie	Percival Vega Gull (Gipsy Six II)	158.2
11	Butler	Percival Vega Gull (Gipsy Six II)	Eliminated.
8	Rose	Miles Speed Hawk (Gipsy Six I)	169.7
7	Broadbent	B.A. Double Eagle (2 Gipsy Six I)	161.2
6	Henshaw	Percival Mew Gull (Gipsy Six I)	189.3
4	Gardner	Percival Mew Gull (Gipsy Six II)	213.8
5	Waller	D.H. Comet (2 Gipsy Six II)	200
3	Percival	Percival Mew Gull (Gipsy Six II)	225.2

SKETCHED AT HATFIELD

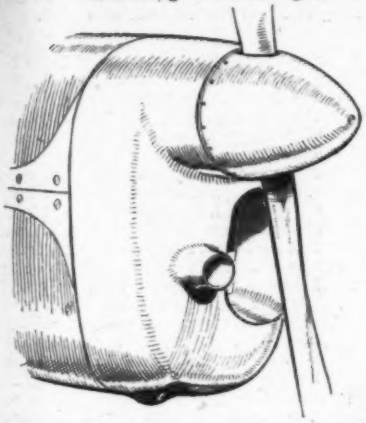


Details of the latest version of the B.A. Double Eagle's retractable undercarriage.

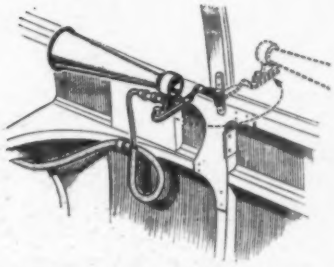
(Below) The air intake in the cowling of Capt. Percival's Mew Gull, near the airscrew, gives a boosting effect.



The elevator and rudder hinge gaps of Lowe's Comper Swift were faired over with metal foil doped to the fabric.



Mr. Miles has adopted this "leg"-type undercarriage for the Magister.



Venturi tube on a swivelling mounting on Henshaw's Mew Gull.

manding with some feeling that the King's Cup itself should be toasted); Brig.-Gen. Lewin (popular demand; he thanked his hosts very nicely indeed); and Flt. Lt. Rose (popular demand for his inevitably amusing and very pointed comments). Nobody was hurt and everyone, whether of totalitarian or Imperial state of mind, appeared to want to see the race using Baldonnell (or Collinstown, the new civil airport) in years to come. Those who were not too sleepy thereafter moved on to a dance.

In the morning the pilots of slow machines sighed because the weather was too good, but were glad to see the wind in the north—of this assistance they would be able to make good use; the pilots of fast machines were indifferent, but glad that good visibility could be expected; and the pilots of very fast machines were more than glad to see that the wind would be strong, enabling them to fly out of Newtownards and Stanley Park with greater safety while carrying a reasonable supply of fuel for the next stage.

Before 10 o'clock the machines were being wheeled out and two pilots, at least, Gardner and Henshaw, promptly taxied theirs over to the compass base. Friday's buffeting had evidently knocked the corrector magnets about, or otherwise played the devil with the readings. However, promptly at 11.30 a.m. Willis and Potter left in the B.A. Eagle which, in the circumstances, was thought to have as good a chance as any. At Dublin, people thought of Percival as the best bet among the faster machines; on the Newtownards-Dublin leg Gardner's Mew had not been giving full revolutions and nobody was quite sure whether the trouble had been finally cured, but, in any case, his win must have come as a surprise to almost everybody. Perhaps really accurate navigation has something to do with it; Gardner has a reputation for that and his stage speeds, after due allowance for a 30 m.p.h. northerly wind had been made, were very consistent. However, we are jumping ahead of the story. Once again visibility was excellent and the bumps were not likely to be as bad as those experienced on the East Coast, though the upper wind speeds were given as 20-30 m.p.h. in the West and 45-60 m.p.h. in the East.

Scarborough scars: Capt. W. L. Hope was only one of several competitors who bore visible evidence at Dublin of the bumping they received on the stretch up the North-East coast. (*Flight* photograph.)

Already at Newtownards Willis' hopes with the B.A. Eagle must have evaporated, for Sqn. Ldr. Harvey's Whitney Straight had eaten up his two-minute start. Otherwise the order remained unaltered, though Schreiber had lost a little to Guthrie: their Vegas had been started together. A few minutes after leaving Newtownards, H. F. J. Broadbent had forced-landed his Double Eagle at West Freugh aerodrome, near Portpatrick, while, at about the same time, Sqn. Ldr. Atcherley was skilfully parking his Gipsy-Swift, no easy matter, on the sands somewhere south of St. Bees Head. G. de Havilland had already suffered trouble with his cowling and later flew straight through from Blackpool. The Double Eagle suffered undercarriage trouble; Atcherley's engine had broken a rocker; and De Havilland's cowling had come unattached and folded back in a manner which defied immediate correction.

Meanwhile, Gen. Lewin's faster Whitney Straight was slowly overhauling

Harvey's, and at Blackpool he was slightly ahead. Here Gardner had overhauled Henshaw, who was later to retire at Stoke-on-Trent with water in his fuel (he had already suffered a momentary and nerve-shattering cut-out over the sea from the same cause), and Percival had overtaken Waller.

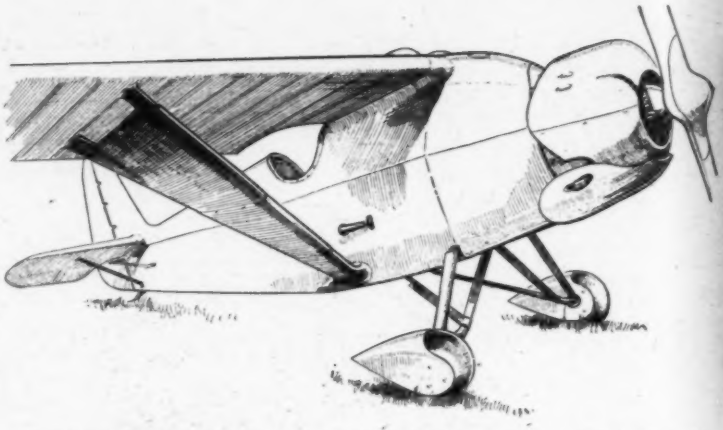
When due allowance has been made for wind effects, the "block-to-block" averages, given as approximations on page 283, are distinctly illuminating. The wind was quite light on the first leg, so the average speeds to Newtownards can be taken as being only 5-10 m.p.h. slower than the true air speeds of the machines. Between Newtownards and Cardiff, of course, the pilots had most of the advantage of a 30 m.p.h. wind, while on the last leg the wind was almost broadside, though, if anything, slightly against them. Judging from these speeds the wind on the first leg must have been slightly stronger for the earlier departures, though it is impossible to make allowances for an occasional failure of a competitor to hold his track correctly. Needless to say, the Blackpool-Cardiff run was the fastest of the day, and Percival averaged something like 252 m.p.h.

At Cardiff the work of Messrs. Dancy and Rowarth was bearing fruit, and it was unfortunate that only the former could be at Hatfield to see the close finish which was obviously to be expected from a study of the Cardiff arrival times. The two Vegas were still fighting it out with a bare fifty seconds between them; Gardner had moved up from the fourteenth to the fifth place; the out-handicapped Waight had lost five minutes to Percival who, however, had only overhauled the Comet since leaving Newtownards; and Harvey and Lewin were lying within seventeen seconds of each other, the latter in the lead. Evidently Harvey was flying a very accurate course with a slightly slower machine; at Hatfield the difference was barely seven seconds.

Against the light of a setting sun it was difficult to pick out beyond the wireless masts the tiny dots which were the leaders and, later, to distinguish them. Until the machine was actually zooming up after the finish it was impossible to be sure that the winner was Gardner, though a Mew Gull it certainly was. Even while he made his circuit three more specks could be discerned. The first, obviously, had the frontal lines of a Whitney Straight (though it might conceivably have been a Vega), and the third machine was certainly gaining on the second. Brig.-Gen. Lewin's Whitney Straight came by less than three minutes after Gardner, and a final dive did not save Sqn. Ldr. Harvey's third place—though there was only three-fifths of a second between his time and Percival's, and the result might well have been given as a dead-heat for third place.

A minute later Guthrie came in, with Schreiber a little more than a minute behind him. Less than seven minutes between the first and the last of seven leaders after a 660-mile race. That is handicapping indeed.

Hereafter follow some impressions from various intermediate controls.



Some extra special fairings were to be found on Lowe's Comper Swift. The wing struts were faired together, unusual spats at the after end of each wheel fitted close up against the tyre, and the special cowling for the Pobjoy engine embodied a neat air intake. The elevator-gap fairing is illustrated in another sketch.

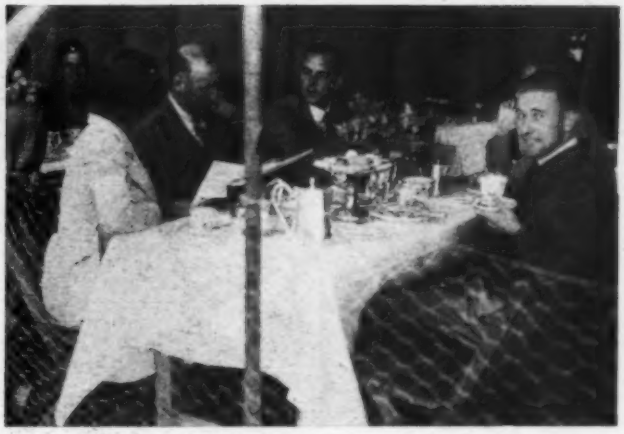
The Woolsington wind-sock gives some indication of the strength of the wind at the Newcastle control. The machine coming in is the Vega Gull flown by Miss Dillon and Capt. Neville Stack.

NEWCASTLE IN THE ELIMINATING RACE

IN view of the strong head wind which everybody thought would delay the arrival of the first machine for at least half an hour, Capt. E. W. Percival surprised Capt. J. D. Irving (control officer), officials and those among the 3,000 spectators who could claim some

Baldonnell from above : The centre of activity at Dublin photographed on Saturday morning. (*Flight* photograph.)

Seeing is believing : Waight looks into the fuel tank of the T.K.4 during replenishment at Renfrew.



Tea-party at Dublin : Miss Pearl Henshaw, "Pop" Henshaw, Ken Waller, and Alex. Henshaw. (*Flight* photograph.)

knowledge of flying when he rocketed over the line at Woolsington, Newcastle, at 10.22 a.m.

He was still flat out as he made a hedge-hopping approach, and sighting Woolsington must have been rather a surprise to him—for a reason that was obvious when, on landing, he was besieged with enquiries as to his speed; it was then learned that his air-speed indicator had not been registering. The ground staff got busy during the half hour and the pitot tube was repaired.

Thirty seconds later Gardner confirmed the highly complimentary remarks which were being freely expressed about Mew Gulls. Then, at 10.28 a.m., the T.K.4—the machine which everybody wanted to see—came out of the blue to make a steep approach turn which certainly thrilled the crowd. To it must go the honour of being the machine with the highest landing speed ever to have landed at Woolsington. First to greet Waight (complete with case containing eight spare plugs) was Mr. E. W. Dodds, of Newcastle, who played a prominent part in the design of the T.K.4.

STAGE SPEEDS IN THE FINAL

Pilot.	Dublin-N'tonards 93.3 mls.	N'tonards-B'pool 200.7 mls.	B'pool-Cardiff 227.2 m.	Cardiff-Hatfield 125.9 m.
	m.p.h.	m.p.h.	m.p.h.	m.p.h.
Willis	124	134	150	130
Harvey	130	141	155	135
Lewin	133	148	155	132
Hope	136	146	157	145
Hughesdon	124	143	153	132
Atcherley	130			
Schreiber	155	172	182	164
Guthrie	160	172	181	164
Stent	160	170	189	157
De Havilland	170			
Rose	175	188	197	168
Broadbent	175			
Henshaw	207	225		
Gardner	224	242	243	216
Waller	200	217	227	194
Percival	233	242	252	220
Waight	224	233	244	210

There were many expressions of disappointment when news was received that Mr. E. J. Jobling-Purser and Mr. W. M. Mackay, the two local enthusiasts, had forced-landed their Miles Whitney Straight on the Town Moor—two miles from the aerodrome—with an empty fuel tank. Instead of landing at Usworth to refuel they decided to take a chance to get through to Woolsington, but when so near they heard the ominous splutter and were fortunate to be within such close proximity to the hospitable moor.

A punctured tyre provided a minor shock for Hole in his Vega Gull, but the damage was remedied and he was able to be flagged out a few seconds after the stipulated 30 minutes wait.

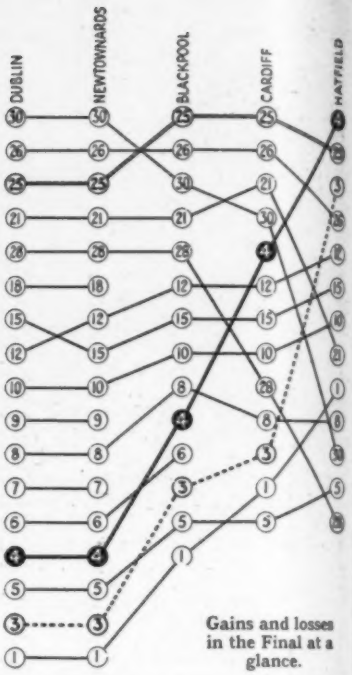
FRIDAY AT RENFREW

THE morning sunlight which spilled over the Border hills as a *Flight* representative went north to see the race in Scotland augured more favourable conditions than were generally presaged by Sassenach prophets. Mid-day at Renfrew saw Old Man Weather trying very hard to behave himself, although his efforts in the cause of sport were outshone by those of the Scottish Flying Club, which had resolved to do right by competitors and visiting citizens, penning-up the latter in a nice little enclosure where they could worship from afar without embarrassing the pilots. And not so much as a saxpence to pay.

PREVIOUS WINNERS OF THE KING'S CUP

Year.	Date.	No. of Entries.	Course.	Total Mileage.	Winner.	Speed (m.p.h.)
1922	Sept. 8-9	22	1ST DAY: Croydon, Birmingham, Newcastle, Glasgow. 2ND DAY: Glasgow, Manchester, Bristol, Croydon.	810	F. L. Barnard D.H.4a (Eagle).	123.5
1923	July 13-14	17	1ST DAY: Hendon, Birmingham, Newcastle, Glasgow. 2ND DAY: Glasgow, Manchester, Bristol, Hendon.	800	F. Courtney, Siskin (Jaguar).	149
1924	Aug. 12	10	Martlesham or Felixstowe, Leith, Dumbarton, Falmouth, Lee-on-Solent or Gosport ...	951	A. J. Cobham D.H.50 (Puma).	106
1925	July 3-4	15	1ST DAY: Croydon, Harrogate, Newcastle, Renfrew, Blackpool, Bristol, Croydon. 2ND DAY: Same course, but flown in opposite direction.	1,626	F. L. Barnard, Siskin (Jaguar).	141
1926	July 9-10	16	1ST DAY: Hendon, Coventry, Cheltenham, Hendon. 2ND DAY: Hendon, Martlesham, Cambridge, Hendon.	1,500	H. Broad, Moth (Cirrus I).	90.4
1927	July 30	26	1ST COURSE: Hucknall, Spittlegate, Huntingdon, King's Lynn Cranwell. 2ND COURSE: Hucknall, Howden, Skegness. 3RD COURSE: As first.	539½	W. L. Hope, Moth (Cirrus I).	92.8
1928	July 20-21	38	1ST DAY: Hendon, Norwich, Birmingham, Nottingham, Leeds, Newcastle, Glasgow. 2ND DAY: Glasgow, Liverpool, Bristol, Hamble, Lympne, Brooklands.	1,096½	W. L. Hope, Moth (Gipsy I).	105.5
1929	July 5-6	60	1ST DAY: Heston, Henlow, Mousehold, Hadleigh, Hornchurch, Lympne, Hamble, Filton, Blackpool. 2ND DAY: Blackpool, Silloth, Renfrew, Dunbar, Cramlington, Hucknall, Birmingham, Heston.	1,179	Flt. Lt. R. Atcherley Grebe (Jaguar).	150.3
1930	July 5	101	Hanworth, Hamble, Bristol, Birmingham, Liverpool, Manchester, Leeds, Newcastle, Hull, Leicester, Hanworth.	750	Miss W. Brown, Avian (Cirrus III).	102.7
1931	July 25	41	Heston, Desford, Norwich, Nottingham, Brough, Leeds, Birmingham, Manchester, Hooton, Heston.	1,000	F/O. E. C. T. Edwards, Bluebird (Hermes).	117.8
1932	July 8-9	46	1ST DAY: Brooklands, Abingdon, Shoreham, Portsmouth, Bristol, Birmingham, Hooton, Woodford, Leicester, Ipswich, Northampton, Brooklands. 2ND DAY: Brooklands, Bristol, Northampton, Brooklands, and Brooklands, Shoreham, Portsmouth, Bristol, Brooklands.	1,250	W. L. Hope, Fox Moth (Gipsy III).	124.25
1933	July 8	35	Short courses from Hatfield	800	G. de Havilland, Leopard Moth (Gipsy Major).	139.5
1934	July 13-14	43	Short courses from Hatfield	800	Flt. Lt. H. M. Schofield Monospar S.T.10 (2 Niagara).	134.16
1935	Sept. 6-7	36	1ST DAY: Hatfield, Newcastle, Edinburgh, Renfrew, Stranraer, Newtownards, Dalbeattie, Blackpool, Woodford, Cardiff, Hatfield. 2ND DAY: Short course from Hatfield.	1,303	Flt. Lt. T. Rose, Miles Falcon (Gipsy Six).	176.28
1936	July 10-11	27	1ST DAY: 2 laps of circular course from Hatfield via Norwich, Nottingham, Bristol, Shoreham and Coventry. 2ND DAY: 12 laps of short course from Hatfield.	1,536	Chas. Gardner, Percival Vega Gull (Gipsy Six).	164.47

Not an arrest for evasion of Customs duty at Dublin—just a helping hand in the attachment of armlets. (Left to right) : Mr. Ashwell Cooke, Major Alan Goodfellow, and two officers of the Free State Air Force, Major Mulcahy and Capt. Murphy. (*Flight* photograph.)



Backed by imposing hangars, with a trio of stilty Spartan Cruisers basking on the tarmac, were the petrol and oil dumps amply stocked and with service crews just itching to be of service.

All-highest at the Renfrew control was Mr. B. R. Millar, with Mr. Ian McWilliam as chief marshal. The various aides were listed on a chart which looked like a genealogical tree. Just an instance of Glasgow thoroughness.

The benign morning sun made even the hyper-critical pass lightly over semi-official references to a Hawkspeed and a Vera Gull. Nevertheless, one could not turn a deaf ear to the dropping of bricks in the official programme in which the Sparrowhawk was dubbed the Hawk Speed Six while the space allotted to the last-named aircraft was usurped by a common or garden Hawk Trainer.

Things began to get interesting when it was proclaimed that Percival had reached Newcastle at 10.25. After that the board told an eloquent story of the race.

At 51 min. 17 sec. past 12 Percival's elegant Mew Gull slipped over the line at a quiet 240 m.p.h. Three minutes later came Gardner in its stable-mate; and how Gardner petted that Mew, deftly polishing the screen and wielding the prettiest of dip-sticks!

Waight's T.K.4, in the current vernacular the snootiest ever, streaked over at Olympian speed and by sitting down quite comfortably, thank you, disappointed those to whom unusual proportions and small wing area are the earmarks of vice.

Ken Waller took his time about lowering the Comet's undercarriage. We subsequently noticed at Blackpool, incidentally, that he was equally slow in raising it after the take-off.

Henshaw whipped in just as the wheels of Gardner's Mew (in which the Series II engine makes a very obvious difference as compared with Henshaw's machine) were leaving the ground on the take-off for Newtownards.

Tommy Rose dropped in a good deal later, reporting that the going had been pretty rough but that things were improving. Then followed the Double Eagle, a covey of Vega Gulls and the Sparrowhawk. The Eagles and Swift trailed in some time later.

There was little individuality in the take-offs, but Guthrie nearly ploughed a furrow with his wing tip in his eagerness to get straight on to his course.

Waight had the T.K.4 off after a slightly longer run than that taken by the v.p. Mews, but little more protracted than Henshaw's get-away in the Mew with the fixed-pitch airscrew.

AT BLACKPOOL ON SATURDAY

LANCASTRIANS, in spite of the strange aversions of some Councillors, are naturally air-minded. Their pet interests in the Race were Stack, once the Lancashire Club's chief instructor, and Tommy Rose, who used to swim about in those parts in an amphibian ferry. They were unhappy because their enterprising Mr. Moss had scratched his Mono.

Royal Aero Club officials in charge were Major R. H. Thornton, Sqn. Ldr. E. H. Spence and Mr. J. C. Cantrill.

Rapides were continually arriving and departing during the race on their lawful occasions, which led some of the less imperturbable officials to anticipate the

THE STORY OF THE FINAL IN FIGURES.

No.	Reg.	Pilot.	Aircraft and Engine.	Handicap Allowance.	Start from Dublin.	Newtownards.	Arrivals at : Blackpool.	Arrivals at : Cardiff.	Arrivals at : Hatfield.	Speed.	Pos.
				h. m. s.	h. m. s.	h. m.	h. m.	h. m. s.	h. m. s.	m.p.h.	
30	G-ADID	Willis ...	B.A. Eagle (Gipsy Major I) ...	1 55 41	11 30 00	12 15	14 19	16 19 03	18 02 13	137	11
26	G-AEVH	Harvey ...	Whitney Straight (Gipsy Major I)...	1 53 40	11 32 01	12 15	14 14	16 11 40	17 53 25	142.4	4
25	G-AEZO	Lewin ...	Whitney Straight (Gipsy Major I)	1 49 42	11 35 59	12 18	14 13	16 11 23	17 53 18	144.5	2
21	G-ACRG	Hope ...	B.A. Eagle (Gipsy Major I) ...	1 43 58	11 41 43	12 23	14 19	16 16 30	17 57 43	145.2	8
28	G-AEMA	Hughesdon...	C.W.A. Cygnet (Gipsy Major I) ...	1 38 28	11 47 13	12 32	14 30	16 28 32	18 10 46	141.3	13
18	G-ABWH	Atcherley ...	Comper Swift (Gipsy III)	1 21 38	12 04 03	12 47	Landed St. Bees.	—	—	—	—
15	G-AEZJ	Schreiber ...	Percival Vega Gull (Gipsy Six II)...	1 05 25	12 20 16	12 56	14 39	16 24 08	17 55 30	171	6
12	G-AFAU	Guthrie ...	Percival Vega Gull (Gipsy Six II)...	1 05 25	12 20 16	12 55	14 38	16 23 20	17 54 21	171.8	5
10	G-ADNL	Stent ...	Miles Sparrowhawk (Gipsy Major I)	1 01 21	12 24 20	12 59	14 43	16 25 19	17 57 35	172.5	7
9	G-ADNO	De Havilland	T.K.2 (Gipsy Major H.C.)	0 53 38	12 32 03	13 05	15 09	Abandoned Race and returned Hatfield.			
8	G-ADGP	Rose ...	Miles Speed Hawk (Gipsy Six I) ...	0 41 53	12 43 48	13 16	14 53	16 32 10	18 01 34	185	10
7	G-AEIN	Broadbent ...	B.A. Double Eagle (2 Gipsy Six I)...	0 41 53	12 43 48	13 16	Landed at Portpatrick.	—	—	—	—
6	G-AEXF	Henshaw ...	Percival Mew Gull (Gipsy Six I) ...	0 10 37	13 15 04	13 42	15 08	Landed at Stoke.		—	—
4	G-AEKL	Gardner ...	Percival Mew Gull (Gipsy Six II)...	0 08 14	13 17 27	13 43	15 05	16 30 24	17 50 51	233.7	1
5	G-ACSS	Waller ...	D.H. Comet (2 Gipsy Six II) ...	0 07 27	13 18 14	13 46	15 14	16 43 32	18 07 43	213.4	12
3	G-AFAA	Percival ...	Percival Mew Gull (Gipsy Six II)...	0 02 10	13 23 31	13 48	15 10	16 33 49	17 53 24½	238.7	3
1	G-AETK	Waight ...	T.K.4 (Gipsy Major II)	Scratch	13 25 41	13 51	15 15	16 40 58	18 01 26	230.5	9

deletion of the "1." However, all went merrily and Brig. Gen. Lewin came romping (perhaps not quite the word) over the line at about thirteen minutes past two. This very sporting gentleman there and then became a popular hero. Sqn. Ldr. Harvey was soon in the picture; he brought his Straight in abnormally low. Then Hope chased Potter's Eagle over the line and Hugheadon clocked in with his metal Cygnet. Wing Cdr. Stent (Sparrow Hawk) sartorially equipped for open-cockpit flying, made a great hit among the local youth. Tommy Rose, who headed a pilgrimage to a tent (not the control) was followed in by Gardner, who started a trek to the tote.

The T.K. 2 stirred things up a bit by flying wide of the finish, landing immediately and taxying over the line. It seemed that De Havilland found his petrol very low and decided to play for safety.

Henshaw came over high and Percival rather lower, followed by Ken Waller in the Comet. "Met." wizards decided that 1,500 ft. was the best height for flying. The wind, it seemed, did not increase with height. Ken Waller had been flying, he found, at just the right altitude.

And here, be it said, we steadfastly refuse to grope around for adjectives to describe the speed of the T.K.4, which turned up next. Suffice it to say that this machine appeared to travel much faster than any of the others. Its subsequent take-off, like the landing, was made in much less space than was predicted.

Without wishing to be too critical of the arrangements at Blackpool (which were, in fact, very well planned, as at all the controls) one must regret the uncertainty which seemed to be prevalent on the question of circuits after take-off. While the first few competitors turned right, almost straight on to their courses, others were instructed to make a left-hand turn which may, or may not, have made a good deal of difference to the result of the race. Percival, for example, took longer to get on to his course than did Gardner.

CARDIFF IMPRESSIONS

WITH the competitors closing-up rapidly, the proceedings at Cardiff on Saturday rather suggested a brief-duration landing competition. Shortly after lunch both members' and public enclosures began to fill, and by four o'clock one could see that a very reasonable percentage of South Wales, together with the Chief Constable of Cardiff, is air-minded.

With the clear weather conditions and a fresh tail wind it did not require Mr. Kenneth Davis at the "mike" to foretell an early arrival of competitors. At exactly 19 min. 3 sec. past 4 p.m. Brig.-Gen. Lewin crossed the line on his red Miles Whitney Straight, closely followed by a more sombre-coloured example of the same breed—actually on the deck first—in the hands of Sqn. Ldr. Harvey.

Wandering through the ranks of the less initiated one could not doubt their enthusiasm, although the guesses hazarded at types were definitely inclined to be wide.

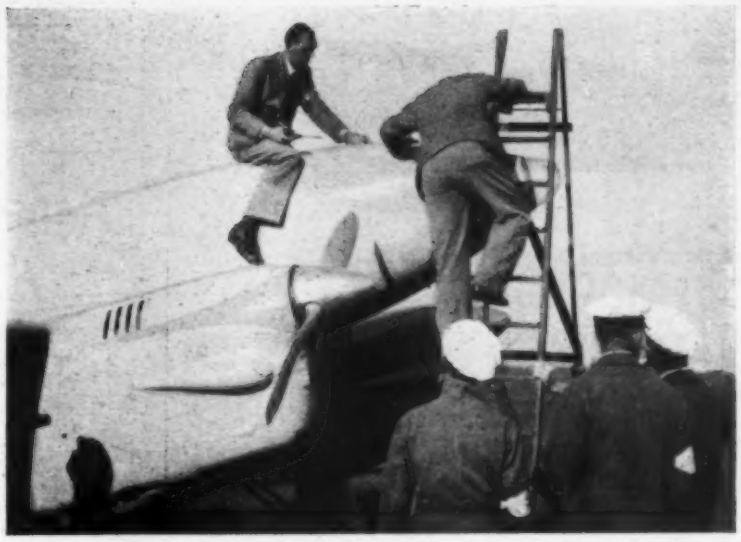
As might be expected, types tended to stay together, and following the two Whitney Straights, after an interval of some five minutes, came the B.A. Eagles, No. 21 then 30.

Giles Guthrie, on his Vega Gull, came in fifth. The first Mew Gull, the blue No. 4 of Gardner, which followed the C.W. Cygnet into ninth place, was greeted with greatly augmented enthusiasm amidst the murmurs of "Captain Percival," "The T.K.4," and, only occasionally, "Mew Gull."

Tenth came a rather glum Tommy Rose on the Hawk Speed Six. Failing all else he should have been cheered on departure by the instantaneous and faultless results obtained from his electric-starter-cum-engine partnership while others swung. Don't mention prop-swinging to Ken Waller; already without hope, he lost a further 35 sec. on the Comet's starboard motor.

The arrival of the T.K.4 was something meteoric, even after that of Capt. Percival on the very pretty cream and gold Mew. The large red-figured boost gauge blocking about 50 per cent. of Mr. Waight's forward vision led one to wonder for a moment whether the Technical College had been holding out on us.

What a work of art this refuelling business is! Capt. Percival dipping with a graduated black wand, Ken Waller with a mighty white "medicine stick" astride the Comet's proboscis, and all this checked by the man on the B.P. wagon. Pity the general scapegoat working the pump!



Ken Waller, seated astride the Comet at Cardiff, superintends refuelling, armed with a screwdriver and a long white wand—like the best wands, invisible. (*Flight* photograph.)

THE PRESENTATION

AS usual, the presentation of the King's Cup, made by Lord Swinton (who had flown down from Yorkshire) was quite a cheerfully informal affair. Cdr. Perrin having, not without some difficulty, succeeded in getting the loud-speakers to cease playing "The Roundabout Broke Down," Mr. Handley Page introduced Lord Swinton, who said that, in presenting this Cup, the first of this reign, the King was not only following a Royal tradition, but was expressing his own interest in aviation, which was that of a practical and accomplished pilot.

Lord Swinton congratulated the winner and also "another young man—Brig. Gen. Lewin" (terrific cheers). He also warmly praised the generosity of Lord Wakefield. The Air Minister then presented the Cup, a ceremony which he and Gardner were forced to react several times, amid growing laughter, for the benefit of the camera and cine-men.

There was one contrastingly serious and hushed moment when Lord Swinton spoke sadly of the fact that "two men whom aviation could ill afford to spare" had lost their lives in the race.

BY THE WAY . . .

The R.Ae.C. had arranged some pleasant curtain-raisers to entertain the Hatfield crowd awaiting Saturday's finish—aerobatics by a Gauntlet of No. 66 (F.) Squadron (there would have been flight aerobatics had the day been less gusty); aerobatics by a Swiss and a German pilot; and a display of model aircraft.

P/O. L. R. Helps was the Gauntlet pilot, and he gave a nicely executed illustration of the whole gamut of Service aerobatics, the intelligent commentary by Mr. E. C. Brown greatly assisting the public appreciation.

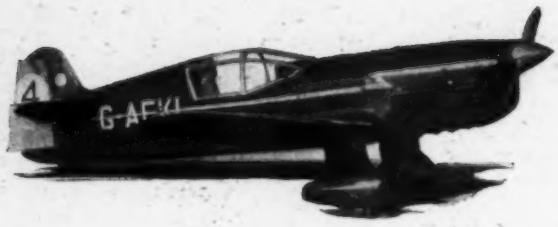
The Swiss pilot was Oberleut. A. G. Fischer, in a Bücker Jungmann, and with less than 100 h.p. he gave a show which defies description. In the modern Continental tradition, it consisted largely of bunts, or outside loops, violent flick rolls, and inverted dives, mainly done at under 500 ft.

Herr Paul Förster, the German pilot, gave a rather similar sort of show with his Focke-Wulf Stieglitz, but, having fifty extra horses to play with, was able to execute his bunts at lower speed, when they seemed even more impressive. Both the Jungmann and the Stieglitz, coming out of their bunts, came virtually to a standstill in the stiff wind.

Not everyone spotted the absence of slots on the T.K.4. In view of the lack of experience with the installation it was decided to delete them in case one should open before the other and start a spin. Eventually tests will be made with the slots tied with piano wire. Bob Waight will take the machine up to, say, 10,000 ft., when they will be freed.

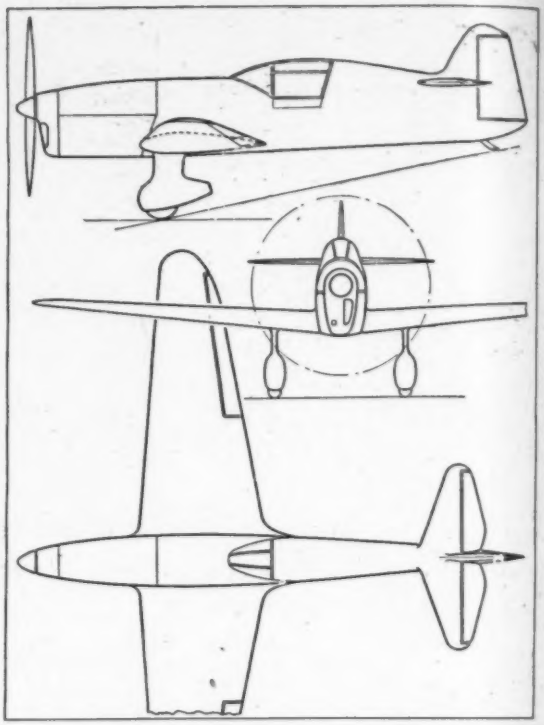
Everyone seemed interested in the model aircraft flown by members of the S.M.A.E. and commented upon over the loud-speakers by Dr. A. P. Thurston and Mr. J. C. Smith. In spite of the high wind they flew very creditably, and one or two vanished into the distance beyond the aerodrome boundaries.

Charles Gardner learned to fly, under the tuition of Surrey Flying Services, in 1931. He took an advanced course with Air Service Training, Ltd.



(*Flight* photograph.)

Gardner's winning Mew Gull (Gipsy Six II). On the right is a general arrangement drawing.



THE VICTORS

Features of the Percival Mew Gull and Miles Whitney Straight

THE Mew Gull of to-day looks, and undoubtedly flies, quite unlike the prototype of 1934, which was built largely with the object of testing a new wing section. So efficient was the original "ND" with its 200 h.p. Gipsy Six engine (the maximum speed was 204 m.p.h.) that Captain Percival decided to continue with its development as a mount for what is known in car and motor cycle manufacturing circles as the enthusiast; he also visualised it as a light mail carrier.

Gardner's victorious "EKL." was originally built for the late Tom Campbell Black, who was killed in a taxying mishap just before the South Africa race last year. It is actually a 1936 model, which means that it has 88.5 sq. ft. of wing area, the loading being over 24 lb./sq. ft.

The standard De Havilland Gipsy Six II-"1,000" size two-position airscrew combination is fitted, giving a maximum speed of something like 230 m.p.h. The cruising speed at makers' recommended r.p.m. is well over 200 m p.h.

Dimensions are: Span 24ft. 9in., length 20ft. 9½in., height 6ft. 10in.

Plywood covering is used for the cantilever wing, the spars and ribs being of spruce. The fuselage is of similar materials.

As in all the Percival models the undercarriage is a fixed cantilever type with "spats" which taper to a knife edge.

Percival split flaps extend between the ailerons and fuselage.

The coupé top is of unusual length for a single-seater and blends extraordinarily well with the main lines of the fuselage.

At its rear end the fuselage is of unusual formation, and carries the cantilever tail plane high up in relation to the wing.

Captain Percival's own King's Cup mount was of the 1937 type, having wings 2ft. shorter in span and a rather better performance. The carburetter air intake in this model is brought round to the front of the cowling probably with a view to obtaining a "ramming" effect.

Equipment.	Gardner (Mew Gull).	Lewin (Whitney Straight).	Percival (Mew Gull).
Engine	Gipsy Six II.	Gipsy Major.	Gipsy Six II.
Airscrew	De Havilland.	Fairey.	De Havilland.
Magneto	B.T.H.	B.T.H.	B.T.H.
Carburetter	Claudel Hobson.	Claudel Hobson.	Claudel Hobson.
Plugs	K.L.G.	K.L.G.	K.L.G.
Camshaft	Weyburn.	Weyburn.	Weyburn.
Bearings	Hoffmann	Hoffmann	Hoffmann
Fuel	Shell.	National Benzole.	Shell.
Oil	Aero Shell.	Castrol.	Castrol.
Instruments	Reid and Sigrist, Smiths, Sperry.	Sperry, Smiths.	Reid and Sigrist, Smiths.
Wheels	Palmer.	Dunlop.	Palmer.
Tyres	Palmer.	Dunlop.	Palmer.
Brakes	Palmer.	Bendix.	Palmer.
Spruce	Bamberger.	Bamberger.	Bamberger.
Upholstery	—	Rumbold.	—
Dope	Titanine.	Titanine.	Titanine.
Windows	Rhodoid.	Triplex & Rhodoid.	Rhodoid.

THE MILES WHITNEY STRAIGHT

A 145 m.p.h. side-by-side two-seater cabin monoplane with a fixed undercarriage, Miles patent flaps, and a D.H. Gipsy Major engine, the Whitney Straight, as used by Brig.-Gen. Lewin and Sqn. Ldr. Harvey, is one of the world's most advanced and popular private-owner types.

Delightful to fly, the "Straight" lands, with its pneumatically operated flaps down, at about 40 m.p.h.

Data are: Span folded 17ft. 2in., length 25ft., disposable load 750 lb., and range 570 miles.

The machine follows standard Miles plywood and spruce structural practice.

The Miles Whitney Straight (Gipsy Major) which Brig.-Gen. Lewin brought into second place. (*Flight* photograph.)

R.A.F. UNITS VISITED

No. 63 (BOMBER) SQUADRON

By Major F. A. de V. ROBERTSON, V.D.

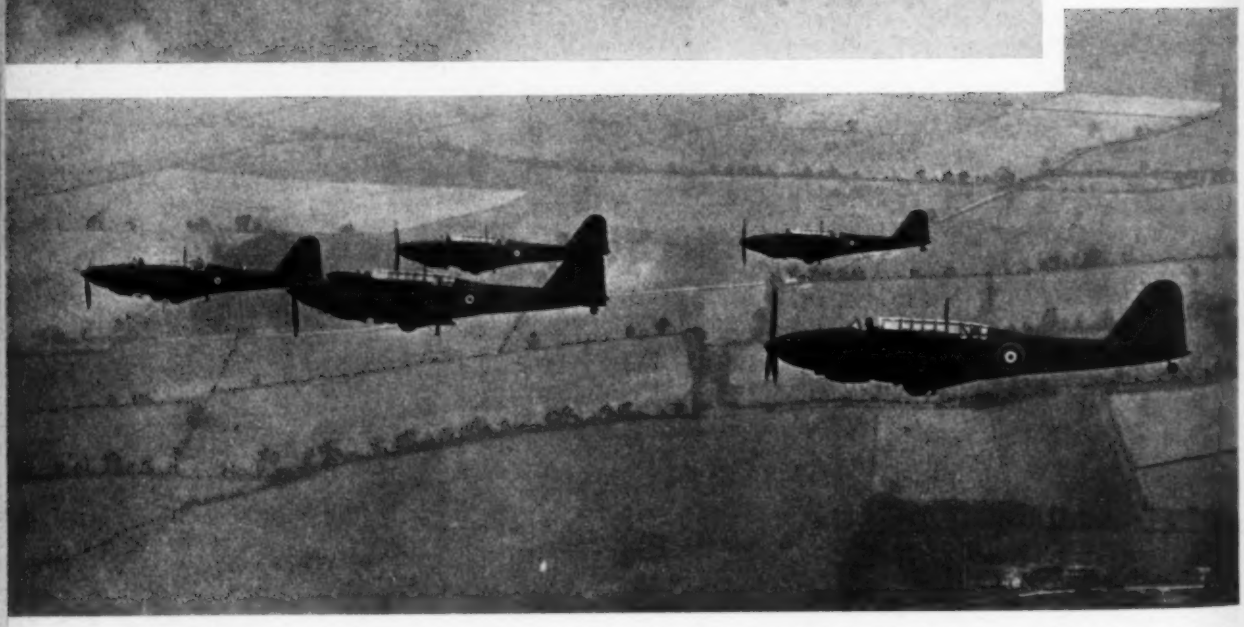
THE medium bomber is the *dernier cri* in the Royal Air Force. The name is comparatively new, though quite a number of years have passed since first No. 101 (Bomber) Squadron received the Sidestrand, then classed as a two-engined day bomber. With the recent expansion programme, the medium bomber has become all the rage, and it was no small honour that was conferred on the newly re-formed No. 63 (Bomber) Squadron when it was selected as the first unit in the Royal Air Force to be equipped with the Fairey Battle with Merlin I engine.

No. 63 B.S. inhabits Upwood station near the small town of Ramsey in Huntingdonshire, which it shares with No. 52 B.S. Upwood is one of the new stations which are springing up faster than one can count all over the country, but especially on the great flat plain of eastern England. It has a most extensive aerodrome which seems to stretch beyond the horizon, and which looks as flat as the proverbial palm of a hand. It is still in the hands of the building contractors, who are busily engaged in making a very fair representation of a front-line trench system, complete with traverses, communication trenches, obstructions, shell craters, and all the rest of it. Amidst the rubble and apparent confusion, vast stately hangars are rapidly rising, seemingly high enough to house a rigid airship, if the Royal Air Force should ever again indulge in that form of aeronautics. At present Hinds, Audaxes, and Battles crawl about on the floor like insects in a lofty kitchen. In due course

"Echelon stepped up" is a most tricky formation, but in the upper picture the young pilots of No. 63 (Bomber) Squadron are doing very well. In the lower picture the Fairey Battles are lined up on Upwood aerodrome. (*Flight* photographs.)

(Top) A flight of Fairey Battles in formation. This picture shows the plan view of the machine as it would appear to diving fighters in air exercises. (*Flight* photograph.)

(Bottom) With its wheels retracted and almost entirely concealed, the Battle is as clean as any aeroplane in the skies. Its top speed is given by the manufacturers as 257 m.p.h. (*Flight* photograph.)



there will also be mess houses and quarters, but for the present the officers and other ranks make the best of good old Army huts.

It may be that the present generation owes a special debt of gratitude to the programme which is producing these new aerodromes. At least the land is being saved from the speculative builder, who is threatening to cover the whole of the English countryside with nasty little jerry-built bungalows. An aerodrome preserves the grass and the fresh air, and the doings on it are always attractive to watch. Do the Huntingdon rustics, one wonders, get all the kick which they ought to get out of watching the first Battle Squadron landing and taking off! They are privileged spectators, if only they knew it.

The past history of No. 63 B.S. will be dealt with later in this article. In its present incarnation the squadron came into being on February 15 of the present year, and consists at the moment mainly of young pilots. Still, young pilots can fly, for the civilian schools and the Flying Training Schools do their work well. The C.O. was once a test pilot at Martlesham, and that speaks for itself. The proper standard will be set in the squadron.

On being re-formed, the squadron was served out with Audax aeroplanes, and proceeded to practise the functions, more or less, of an army co-operation squadron. Soon the Battles began to arrive. That was an exciting moment. It is a double, or even a treble, complication when a new squadron receives a new type of machine, especially when nearly all its pilots are just fresh from their F.T. Schools. But without delay and without hesitation the squadron decided that it liked the Battle very much. It is a nice machine to fly, and the pilots at once felt confidence in it. As soon as the full complement of machines had been received, the squadron was organised on the standard model. That was just before the outbreak of the annual Air Exercises, in which the squadron was called on to take

a part. It was a fairly searching test for a new squadron only recently re-equipped with a novel type of aeroplane about which it had to find out for itself many facts—the facts which even Martlesham cannot tell and which can be found out only by the first squadron which takes the machine into constant use. No. 63 came out of the exercises with flying colours. The young pilots did their work exceptionally well, and there were no "incidents" to point a moral or to adorn this tale. The historian, of course, would like some incidents, but the Squadron Leader thinks that happy is the squadron which (in peace time) has no history. In the Great War, however, this squadron experienced plenty of incidents and made quite a lot of history; so we will now turn back the pages and change the scene from Upwood to Samarra aerodrome.

No. 63's War History

It must be curious for the pilots of a squadron which flies so ultra-modern a machine as the Battle to reflect that their forerunners won fame in the R.E.8. Probably most of the present pilot officers have only a vague idea of what an R.E.8 looked like. But most certainly, if they have imbibed the true Service spirit, they will take a pride in the doings of those forerunners, about which a good deal may be gleaned from the official history—*The War in the Air*. The squadron's history, in brief, is as follows.

The Great War had been in progress for just on two years when No. 63 Squadron began to form at Stirling in July, 1916. Its first C.O. was Major A. C. Boddam-Whetham. There is a Sub-lieutenant A. P. Boddam-Whetham in the Navy now, and he is a flying officer in the Fleet Air Arm. The squadron trained for nearly a year, mostly at an aerodrome on the coast of Northumberland, and then it was shipped to Mesopotamia, as Iraq was then called. On August 13, 1917, it landed at Basra in a particularly hot "hot weather." Major J. C. Quinnell was in command. He is now an Air Commodore, the holder of the Distinguished Flying Cross, and the A.O.C. No. 6 (Auxiliary) Group in the Bomber Command. He had under his command 30 officers and 200 men.

At first everything went wrong with the squadron. The heat of Basra fell on it like a blight, and men and officers went sick like flies. Before long there were only six officers and 70 men fit for duty, and they were all below par. Thirty men had to be evacuated to India. The machines were erected in the open on the banks of the Tigris. It was found that spars and other wooden parts had warped in the heat, and the spruce engine-bearers had split. New ones of ash had to be made in the workshops. It was a trying time, but by degrees the machines were made serviceable, and during September and October they were flown up to Samarra aerodrome.

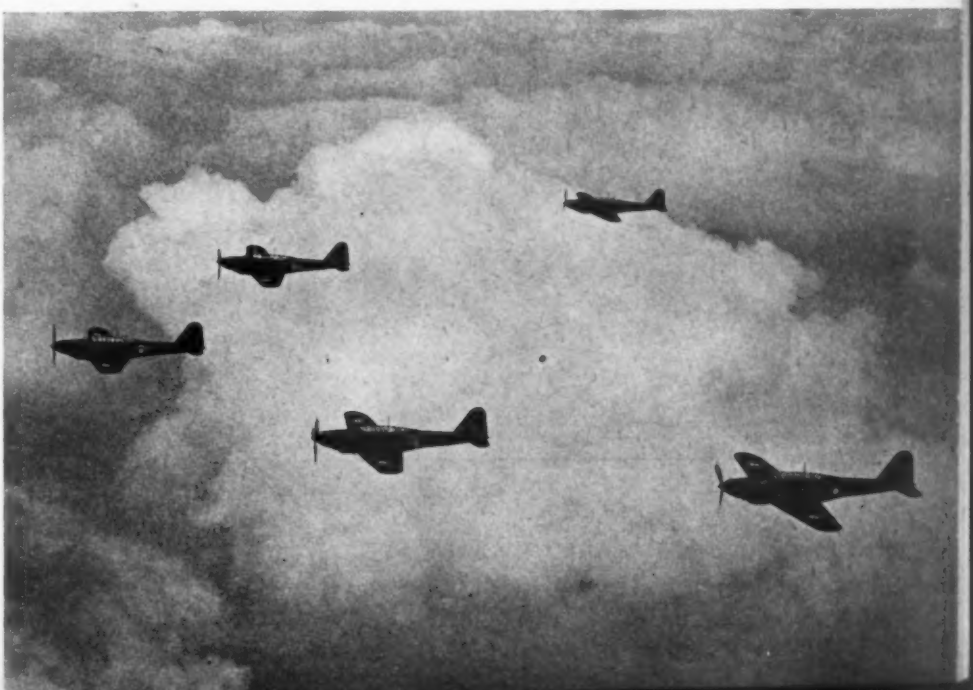
The first reconnaissance was made on September 25, and the squadron's bad luck still followed it. Two R.E.8 machines went out and they met a Halberstadt fighter. One R.E.8 dived at it, but the wing extensions folded back and the machine crashed. The other machine had engine trouble and was forced to land in the desert. It did not return to its aerodrome. On October 5 a third machine was lost.

Before the end of October Major Quinnell left for England, and the command of the squadron was given to Major R. A. Bradley, from Egypt. He had been in Iraq before, during the fighting round Kut, and knew the country. At this time only two flights of the squadron had the R.E.8, while the other was equipped as a fighting unit with Spads, Bristol Scouts, and Martinsyde Scouts. Nothing more is said in the official history about this fighting flight of No. 63, and it may be presumed that it reverted to reconnaissance duties.

Speedily the squadron recovered from its initial bad luck, and began to do very useful work. In November, General Maude began to advance up the Tigris (though he died from cholera before the month was out, and was succeeded by Gen. Sir W. R. Marshall). Before the advance No. 63 reported the movements of the Turks at Daur and Tikrit, and these reports determined the tactics of Gen. Maude. During the capture of Daur on November 2 the squadron was on contact patrol, which means reporting to H.Q. the advance of the various infantry forces. In this case some Indian regiments had not before worked with aircraft, and did not display signals to show their advance. Things went better three days later when the Turks were driven out of Tikrit, and during that fight three machines of No. 63 worked very well with the artillery. The War Diary of G.H.Q. says: "A feature of the operations has been the co-operation between our aeroplanes and artillery."

The Turks continued to retreat, fighting as they went, and sometimes only aircraft could keep in touch with them. On one occasion information was received of a convoy of 160 camels which were marching from the Tigris to the Euphrates. No. 63 was told to make itself rude to the convoy, and Capt. R. D. Simpson and Capt. J. H. Caldwell went out to find it. The calculations worked exactly, and the pilots duly found the convoy. They came down to 300 feet and dropped fifteen 20-lb. bombs, and then fired ten drums of s.a.a. at the unfortunate beasts and their escort. There were numerous casualties, and the rest of the convoy scattered. It was a minor incident, but a smart piece of work, and must have been a nasty surprise for the Turks.

No. 63 itself got a rather nasty shock not long afterwards. The pilots and other ranks were enjoying their New Year's Eve dinner, doubtless with the customary decorum, when two German machines came over and most tactlessly bombed the cookhouse. No other damage was done, but the Hogmany spirit was interfered with, "the unexpended portion" of the dinner was spoilt, and there was much smashing of crockery, as well as pots and pans. Of course, things could not be left like that, and No. 63 asked its companion squadron, No. 30, to join in reprisals. On January 3, 1918, twelve machines from the two squadrons deposited a ton of bombs on Humr aerodrome, whence the Germans had come. About this time there were many



Shadow-shading helps to make an aeroplane inconspicuous when seen from above with the earth as a background, but against a white cloud the machines stand out vividly. (*Flight* photograph.)

A War-time group of No. 63 Squadron in Mesopotamia. Names left to right : Standing : Flt. Sgt. Rhaney, Lt. Moller, Lt. McFarlane, Lt. Mathews, Sec.-Lt. Tiger, Lt. A. E. Evans. Sitting : Lt. Bayley, Lt. Frogley, Capt. J. Everidge, M.C. (Commanding), Lt. Lace, Lt. Crichton.

raids by both sides on the aerodromes of their opponents. Our side suffered some losses, and one particularly ghastly incident was the finding in the desert of the naked body of a pilot of No. 63, who had evidently fallen into the hands of some Bedouin.

In February and March, 1918, Gen. Marshall continued to drive the Turks back, and No. 63, together with No. 30, continued to play an active part in the operations. Before the attack o Hit, flights from these two squadrons were combined under Major Hereward de Havilland, a name already famous in aeronautical circles. After the battle of Khan Baghdadi a Turkish force of 4,000 men was surrounded and surrendered on March 26. On the day before the surrender, Lieut. Col. Tennant, Commanding 31st Wing, R.A.F., was taken prisoner after a forced landing, but was rescued after a spectacular dash by armoured cars. While he was still prisoner the command of the Wing was given to Major Bradley, and consequently Major F. L. Robinson took command of No. 63 Squadron. He is now a Group Captain, commands No. 2 Flying Training School, Digby, and wears on his tunic the D.S.O., the M.C. and the D.F.C.

April, 1918, was marked by heavy gales, and little flying was done in Mesopotamia, but one flight of No. 63 was detached to take part in operations on the Persian border towards Hamadan. It returned to Samarra on May 2. Things were quiet for a while, but after Allenby's victory over the Turks in Palestine and the advance in Macedonia, which forced the Bulgarians to sue for an armistice, the War Office recognised that Turkey's part in the war was near its end, and Gen. Marshall was directed to press the Turkish army hard in Mesopotamia. So he prepared an advance up the Tigris. No. 63 took detailed photographs of the Turkish positions before a move was made. They left one flight at Ramadi, but in its place one flight of No. 72 Squadron, which had fighter machines, Camels and S.E.5a's, worked with No. 63. They co-operated first with the advance of Gen. Cobbe's column. This was in October, 1918. On the 15th of the month the squadron moved its headquarters forward from Samarra to Tikrit so as to be within easier striking distance of the retreating Turks.

Things then became exciting as the British pressed hard on the enemy. No. 63 reported a column of 1,500 infantry with transport trying to escape towards the east from Humr bridge. No. 72 sent a Camel and an S.E.5a to attack them, but the Turks kept their discipline finely, and their fire drove the fighter off. Still the column saw that it was discovered, and turned back towards the main Turkish body. Meanwhile a cavalry brigade with armoured cars had worked round to the rear of the Turks and threw itself across their line of retreat. There was an anxious time while the enemy tried to break through to Mosul, but they failed to do so, and in consequence the whole Turkish army surrendered at Sharqat. Over 11,000 prisoners were taken. On October 31 an armistice was signed with Turkey.

No. 63 Squadron, its work well done, remained on in Mesopotamia, and about a year later was disbanded there. For eighteen years its number did not appear in the *Air Force List*, until the present expansion programme brought it once more into existence. Those who have been privileged to see something of its work feel sure that its future will be as creditable as its past record.

The re-formed No. 63 Squadron. Squadron Leader V. S. Parker, D.F.C., A.F.C., the Commanding Officer, is in the centre. (*Flight* photograph.)

COMMERCIAL AVIATION

THE WEEK AT CROYDON

Heavy Evening Bookings : Stimulating Passengers' Interest : Personals' New Premises : North Easterns Busy : Crowded Tarmac

FINDING myself in Paris the other evening, and naturally wishing to return Croydonwards, I thought that, with Imperials, Air France and British Airways services from which to choose, the matter would be one of reasonable simplicity. Between them they run four services after five o'clock or thereabouts. Innocently enough, and pressed a bit for time so that supper was out of the question, I phoned Imperials, knowing that, once aboard, their schedule would give me ample time to look after the inner man, but there was not a seat to be had; the last Air France machine was similarly *sans places, monsieur;* and both British Airways express services were chock-a-block. Enquiries revealed that such a situation was more or less normal these days—a most satisfactory state of affairs for these companies and no doubt due to the Exhibition, which time did not allow me to see. I left by British Airways' nine o'clock service on the following morning.

Electrification

After the exceptional warmth of the preceding days the chill of M. Pierre Cot's colossal main hall offices at Le Bourget (which will indubitably be most impressive when finished, and call for skates for all officials there stationed), and the somewhat limited prevailing visibility did not promise too well for my first experience of the Lockheed Electra. However, after flying blind for a couple of minutes or less, we came out into sunshine and warmth, and levelled off with the machine trimmed in an imperceptible climb.

We saw the blue sky above us nearly all the time and passed on steadily and quietly through five layers of cloud. Fellow passengers either conversed, read or snoozed, and personally I found no foundation for the suggestion that the Electra s accommodation is restricted, nor could I note any sign of altitude discomfort (we flew eventually at 9,000 ft. or so) amongst our full complement of passengers. For what they are worth I might mention two points: First, that none of my fellow travellers made use of the neat adjustment for chair-angle, presumably because they thought these to be fixed; and second, that I *did* miss a cabin altimeter and clock. A tab on the back of each chair with the words "Adjust your chair" would encourage passengers to relax according to their (literal) inclinations. An altimeter always adds, I think, to the interest of a journey, while in this instance a clock is a good advertisement of the brevity of the run. [Passengers feel no ill-effects at 10,000 ft. if they think the machine is flying at 3,000 ft. Knowledge is a dangerous thing.—ED.] Another small but important point noticed both at Le Bourget and Croydon was that B.A.'s skippers always shepherd their passengers through Customs—a rather nice and personal touch, I thought.

Talking of personal matters, the services of Capt. Bill Ledlie and his hearties seem to be constantly in demand these days, for they are here to-day and gone to-morrow. Personal Airways, by the way, have revised their accommodation here, having improved their booking facilities by taking up residence at the far end of the main hall in a newly built and cosy apartment adjacent to British Airways and the new immigration hutch. Here Mr. Tafly Evans, late of Lep Transport, will be able more conveniently to impart his specialised knowledge to would-be travellers who require "Personal" attention.

JERSEY EXPRESS: The Island of Alderney passes beyond the wing-tip of a homeward-bound Jersey Airways' D.H.86, the crews of which nowadays have permission to cut the corner of the French coast, which can be seen in the left-hand corner. (*Flight* photograph.)

With certain people moving north for gun parties and so forth it is not surprising that the past week has seen North Easterns exceptionally busy, and several days saw full loads to Aberdeen, while their intersection traffic, between Doncaster, Newcastle and Perth has been quite heavy. An interesting appointment is that of Mr. H. J. Larkin as operations manager; he was previously with K.L.M., assuming this office at Doncaster.

King's Cup Schooling

The result of the King's Cup was once again a matter of satisfaction to Surreys, as Mr. Charles Gardner was originally taught to fly by them; incidentally, four new pupils joined the S.F.S. school last week. Mr. Hancock went up to the St. Leger at Doncaster with their Vega Gull and the occasion was notable in so far that, for the first time in his life, he backed a winning horse. It is interesting to hear that the S.F.S. Fox Moth G-ABUT, duction Gipsy Major engine "still running strong" on its new thousand-hour basis.

I omitted to mention last week that K.L.M. had an interesting load of Metropolitan Police athletes—mostly footballers, I am told—to Amsterdam in a specially chartered F.36. Bookings on this company are still satisfactory, despite increased competition on the Rome run now that Air France link up with the Italians in Paris. Which reminds me that A.B.A.'s Stockholm run, which is alternated with that of the Dutchmen, is proving most popular and is operated with commendable regularity.

Brian Allen Aviation have of late been busy with demonstrations of the Stinson, which appears to be a singularly easy machine to sell; some interesting clients may shortly be added to the increasing list of Stinson owners.

T. A. R. MAC.

Gatwick's Future

UNDER terms just concluded between the Air Ministry and Airports, Ltd., Gatwick and Gravesend Airports are to become the home of two Volunteer Reserve Schools. Work will start on October 1, Airports, Ltd., providing the instructors, ground engineers and general staff. The chief instructors have already been appointed and the contracts are for three years in the first instance.

The company will, of course, undertake other work, such as that involved in repairs and maintenance at the two centres, whose civil character and classification will be preserved.

Commercial Aviation

The Stornoway Service

WITHIN the next month or two West of Scotland Airways hope to inaugurate a thrice-weekly air service between Stornoway, Portree, Tobermory and Greenock. Capt. Glyn Roberts visited Stornoway on September 9 with two Air Ministry officials in order to examine Stornoway Harbour as a possible seaplane base. This service, when introduced, will face competition from Highland Airways, who are at present negotiating with the Stornoway trustees for a lease of a large part of the golf course.

Danish Re-Equipment

THE Danish airlines D.D.L. recently asked Mr. Fisker, Minister of Public Works, for permission to increase the company's stock capital from 645,000 to 2,500,000 kroner, chiefly with the aim of buying two new Douglas D.C.3s. The D.D.L. fleet is urgently in need of renovation as a recent incident emphatically demonstrated. One of the three engines of the company's Fokker F XII went on strike, and, as no reserve engine of this type was available, the engine of the old Fokker used in the Copenhagen-Esbjerg run had to be torn out and used. Consequently, operation of the Copenhagen-Esbjerg line had to be discontinued, although the schedule was not supposed to expire before September 15.

Internal Economy

JUST now there are really vigorous signs of economic co-operation, or even amalgamation, between the various internal air line companies.

Some details of the Scottish agreement, involving Northern and Scottish Airways, R.A.S., and David MacBrayne, have already been given and, while official information from Olleys is not forthcoming, we learnt at Liverpool that Blackpool and West Coast had at least come to an operating agreement with R.A.S. Since their line does not directly compete with any other, North Eastern Airways are not interested in these moves, though they are ready, of course, to co-operate with other companies in order to avoid wasteful competition. The Maybury Committee has spoken!

Incidentally (and without a word to anyone) Olley Air Services appear to have started their long-planned Scilly Islands run, sensibly using the excellent G.W.R. link from London. The jumping-off point is near St. Just. Their modesty is admirable, but if they don't tell the public we cannot imagine how this public is expected to find out about it. Possibly they want to give their Dragon a little airing first, just to see how things pan out.

Freight Only

EARLY this year we learnt that a company had been formed for the express and special purpose of conveying freight at competitive rates; in the issue of March 18 brief details were given of the project, though the principals asked specially that little should be said for the time being; and a few weeks later we learnt that the first of a fleet of Curtiss Condors had been shipped over from America and was being erected at Southampton.

This company, International Air Freight, Ltd., of 120, Pall Mall, London, S.W.1, is now in action, and two daily return services are being, or are shortly to be, operated between Croydon and Schiphol, Amsterdam, surface collection and delivery being arranged for the two areas. Belgium will be the next objective. The standard rates are 6½d. per kg. (2.2 lb.) for consignments between 50 and 2,000 kgs., with modifications for smaller loads. The company, of course, arrange for the insurance and customs clearance of all goods.

Apparently I.A.F. were unable to obtain English machines capable of carrying bulky merchandise in suitable quantities and the Curtiss-Wright Condors to be used have, of course, the necessary approval. These are of the later type, with Wright Cyclone F engines of 680 h.p. and variable-pitch airscrews, giving a maximum of 170 m.p.h., and Marconi radio has been installed for operations on this side of the Atlantic. Each machine will carry a pilot and a radio operator. The actual payload of the Condor is a little over two tons, but, more interesting, perhaps, the cabin has a total capacity of 700 cu. ft. or more.

Mr. Daniel Metz, formerly with the Citroen Company, is the managing director, while Capt. W. L. Hope (well known as a pilot and organiser of Air Taxis, Ltd.) is technical director and Mr. Guy Robson (a private owner of long standing and at present owner of a Dragonfly) is the commercial director. Capt. Woolf Barnato is also on the board.

A number of other well-known people are financially interested, including Sir Maurice Jenks, Sir Malcolm McAlpine, Sir Percival Perry, Mr. Edward Robson, Mr. W. L. Stephenson and Sir Louis Sterling.

Faster to the Riviera

THE introduction of faster machines, with top speeds of 220 m.p.h., has resulted in important changes in the recently issued Air France timetables.

The speeding-up on all lines radiating from Paris has made it possible to fix the departure time of the first of the three daily services from Croydon as three-quarters-of-an-hour later than was formerly the case, and yet this will still connect with the Continental departures from Paris for Switzerland, the Riviera and North Africa. Winter passengers will now leave Croydon by the first service at 9 a.m. instead of 8.15 a.m. The use of Marcel Bloch 22-seaters has considerably reduced the time taken, and Cannes, for instance, is reached 2¾ hours after leaving Paris, this time including half-an-hour's halt at Lyons.

Winter sports enthusiasts are for the first time catered for in a special service which, connecting with the early morning London machine, covers the distance direct from Paris to Geneva in well under two hours. This service will run only at week-ends.

British Airways' Base

BRITISH AIRWAYS' long-expected move to Heston is likely to be made some time in the early part of the new year. Quite apart from operational difficulties involved during the change-over, a great deal of the company's maintenance work is still being carried out at Gatwick and it is impossible to move everything, lock, stock and barrel, with a day's notice.

However, now that Heston is Government owned, it seems probable that the very necessary blind-approach extension will be made to the east and that the G.W.R. will eventually have its special spur-line to the airport. Before then, however, new buildings may be grouped on the northern boundary. Some of which is very much in the future, but the extension is vitally necessary for all-weather transport work by Jersey Airways, British Airways and any other company eventually making regular use of the airport. British Airways, incidentally, will in due course be starting their West African and South American experimental work with large machines—possibly D.H. Albatrosses—and their headquarters will need to be amply large.

Lost Horizon

ONE of the two D.L.H. Ju. 52 machines which have been carrying out a survey flight of the far eastern route has been missing somewhere between Ahnsi, in the Kansu Province, and Kapul. Ban von Gablenz, of D.L.H., was among those on board and the R.A.F. have been assisting in the search.

Germany's recent survey flights over Central Asia brings to mind that country's long-standing plans for an air service between China and Europe. These plans have been seriously hampered since they were first mooted seven years ago, and a little history would not be out of place at the present moment.

In 1930 the Chinese Ministry of Communications signed an agreement with Deutsche Lufthansa whereby the former was to subscribe two million dollars (since increased to three million) Chinese currency for the formation of the Eurasia Aviation Corporation. The company was incorporated under Chinese law and aimed at opening an air line between Shanghai and Berlin. The plan was, first, to organise domestic air lines in China, with Shanghai as the starting point, extensions reaching the Sino-Russian border and on to Berlin.

After a prolonged period of careful preparation a number of flights were made on the Shanghai-Manchouli route, but, owing to the unsettled conditions prevailing in Manchuria after the Mukden incident in September, 1931, these had to be suspended. As an alternative the company then attempted another route by way of Kansu and Sinkiang. This lies across high mountainous regions and extensive stretches of desert; weather conditions are almost invariably adverse for flying, and much of the territory is seldom, if ever, visited by man. Here the initial difficulties encountered were in the establishment of aerodromes, the erection of wireless stations, the transportation and storage of petrol and the supply of mechanics. Nevertheless, by dint of great perseverance, scheduled flights from Shanghai to Lanchow and Urumchi were accomplished in 1933.

But there were further hindrances. The line from Lanchow to Urumchi was interrupted as a result of political disturbances in Sinkiang. Continued unrest brought further operations to a halt, though the Eurasia organisation was far from inactive. Tangled international relations, however, ultimately led to the dismissal of further consideration of the Asia-Europe project, and the opening up of internal routes became the main policy.

AIR-MAIL COMMENTARY

Souvenirs of Double Atlantic Flight : Jersey Airways' First Mail : Commemorating Mermoz

By ALEC DAVIS

WHEN Dick Merrill made his record double flight across the Atlantic, he carried a small amount of mail, specimens of which will form souvenirs of a notable flight and also of the Coronation, in connection with which it was made. For the west-to-east flight, each cover to be flown by Merrill was franked with an American air stamp postmarked in New York on May 8, and rubber-stamped with a cachet showing the Union Jack, Stars and Stripes, and appropriate wording; then in London for the return flight each was postmarked again five days later (incidentally, on a Coronation stamp within two and a half hours of its issue).

Another cachet, with crown and initials G.R., was applied also for this return flight; and, finally, there was a New York reception postmark of *the following day*. Covers (one of which is illustrated here) are now changing hands at good prices.

More modest in appearance, though also bearing a special commemorative mark, are the covers carried from Southampton to Jersey or vice versa on the latest British internal mail service (the Post Office's term "inland" hardly seems accurate for an over-water route). These covers have the wording "Jersey Airways, Ltd.—First Air Mail Flight, June 1, 1937," which leaves very little to be added, except that the service is welcomed as a considerable improvement in communications between Jersey and the mainland. Letters posted in London too late for the ordinary mail, but in time for the final night collection, are now delivered on the first day (instead of the second) after posting, a considerable saving of time, considering the comparatively short distance involved.

Bermuda—U.S.

Commemorating the inauguration of another oversea air route, but a longer one, are covers carried on the first Bermuda to New York flight. In Bermuda an official cachet was applied with the wording "Bermuda—U.S. Service, R.M.A. 'Cavalier,' First Flight."

France and her colonies have more than a fair share of air stamp news at the moment. Late in April there were issued two commemoratives bearing fine portraits of the late Jean Mermoz, perhaps the first exponent of really practical trans-atlantic flying. He carried the first air mail across the South Atlantic years ago, in a single-engined Latécoère seaplane, and went on to repeat the flight time and time again in more modern aircraft, till the day came when he and his companions flew out for the last time. The pilot's head is shown on both stamps, facing left on a 30c. value, and right on a 3 franc.

France, too, has decided that her Central African colonies of Gaboon, Middle Congo, Oubangi-Chari and Tchad shall cease to have separate stamps, and has issued a set for use in them all, with the inscription *Afrique Equatoriale Française*.

Jean Mermoz, famous mail pilot lost in the South Atlantic, is fittingly commemorated.

As the service of Air Afrique and Sabena touches this territory, air stamps are included—eight of them, ranging in value from 1fr. 50c. to 10fr. 75c.

There are two different designs, both by J. Douy. The lower values show a four-engined Latécoère 400 flying boat of the record-breaking *Croix du Sud* type, in flight over Pointe-Noire; and the upper values show a three-engined monoplane, apparently intended to be one of the Savoia S.73 machines used by Sabena, though the picture is not entirely accurate in detail.

The colours used for the new stamps are remarkable. They include such combinations as olive-black and lemon, chocolate and green, and violet and pale green.

Other new air stamps of greater or less importance come from Nicaragua (illustrating, again, our old friend the Ryan Brougham, which figures on many stamps of South and Central America); China, Panama, Peru, Salvador, Libya, Paraguay and Switzerland.

India promises a new set with at least one value illustrating a Short Empire flying boat, while the Free State of Danzig has issued several new stamps showing a sinister-looking aeroplane over the city's skyline, and the initials DLB, for Danziger Luftschutz Bund, or Air Defence League.

The Latécoère boat of the *Croix du Sud* type, and something like a Savoia S.73 on new stamps for French Equatorial Africa

(Below) This envelope made a double Atlantic crossing with Merrill

Aeromaritime Passengers

SINCE last Monday passengers have been carried between Dakar and Cotonou on the Aeromaritime West African service which is being operated with Sikorsky S.43 amphibians.

Proof of the Lighting

IT can be appreciated that a process such as airscrew manufacture calls for efficient works lighting, and in this connection it is worthy of note that the Airscrew Co., Ltd., have recently installed an entirely new lighting system at their Weybridge factory. The blade shop, inspection department and experimental department are now lit throughout by G.E.C. "Osira" electric discharge lamps, and the system is to be further extended.

ANOTHER SHORT MASTERPIECE

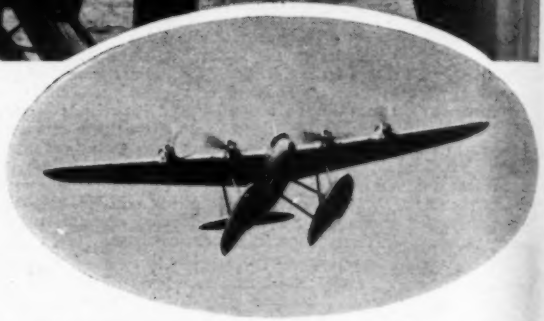
"Mercury" Exceeds Design Estimates : Perfect Handling Without Modifications : A Still-air Range of 4,000 Miles

FIRST test flight on Sunday, September 5, second test flight on Monday, September 6, and demonstration on Wednesday, September 8. Rarely, if ever, in the history of British aviation has an aircraft of new design proved so absolutely "right" in every respect that it could, with every confidence, be publicly demonstrated on the third day after its first taking the air. Yet that is the record of *Mercury*, the upper component of the Short-Mayo composite aircraft.

Mr. Lankester Parker took the machine up for the first time on Sunday, September 5. The next day he had it up again, and on Wednesday of last week he gave a perfect demonstration of the machine before a number of interested spectators. Everything went like clockwork, including the four Napier-Halford Rapier engines, which started immediately without any fuss or bother. The river at Rochester is none too wide, and once one or two engines have been started the machine must perforce be cast off from its mooring buoy and cruise around until the remaining units are working.

On this occasion *Mercury* was loaded up to within 1,000 lb. or so of the gross weight at which it will ever be asked to take off under its own power, and the take-off occupied exactly fifteen seconds in practically a calm. In view of the fact that fixed-pitch wooden airscrews are fitted, the pitch of which is set for fast cruising at about 10,000ft., this take-off time is testimony, not only to the aerodynamic but to the hydrodynamic qualities of the machine.

Of the actual flying demonstration little need be said. Very naturally, nothing of a spectacular nature was attempted, but the fly-past at speed was very impressive, and it was amusing to see the photographic aeroplanes trying their best to keep up with *Mercury*. The landing was—well, just what one would expect it to be with Lankester Parker at the controls. Without trailing-edge flaps there was a certain amount of "float"; that was to be expected of a machine as clean as *Mercury*, and, although Parker was obviously not taking any chances by bringing



Just before *Mercury's* third flight: Mr. J. Lankester Parker going on board to give his demonstration. Mr. H. L. Piper, who will fly the machine during the next series of tests and during the actual separation, watches from his perch on one of the floats. The picture below gives a good idea of the neat installation of the Napier-Halford Rapier engines, while the graceful lines are well brought out in the photograph of the machine flying overhead. (*Flight* photographs.)

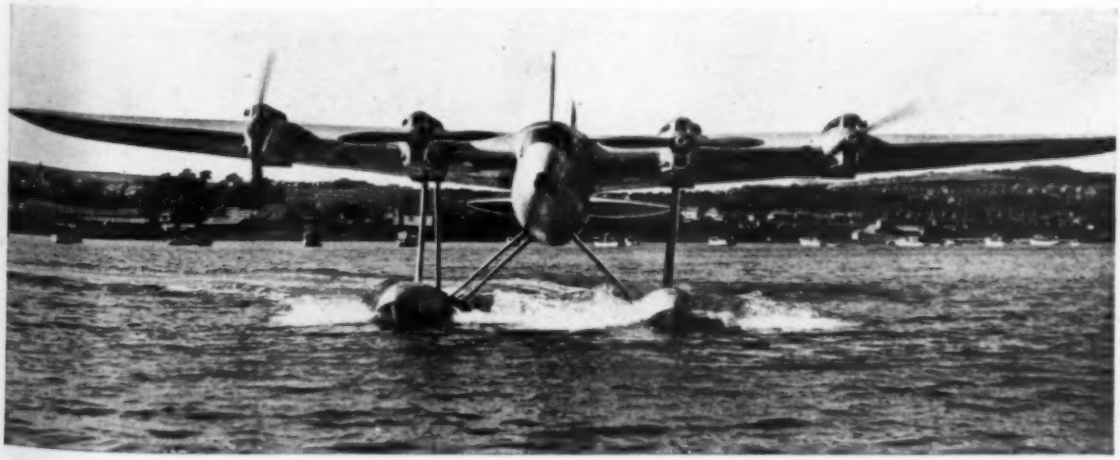
In spite of its large floats, *Mercury* appears to have a top speed of considerably more than 200 m.p.h. The reason is visible in the lower picture, which shows the very small frontal area. Note how little the Napier-Halford engines project. (*Flight* photographs.)

the machine in as slowly as possible, the speed at the moment of touching appeared by no means excessive. As a seaplane the machine probably does not need flaps; as a landplane it would certainly be advisable to fit them.

Everyone at Shorts was in high spirits during our visit on the Wednesday, as, indeed, they might well be. Although very accurate speed tests had not been made, *Mercury* appeared, from A.S.I. readings and rough checks on landmarks, to be very nearly 20 m.p.h. faster than the designer's estimated figures for cruising speed. In other words, the machine will probably be doing a speed of close on 190 m.p.h. at the cruising revs of the engines. In a flight of some 18 hours' duration that means an increase in range of approximately 360 miles, so that it can be said that the still-air range of *Mercury* is very close to 4,000 miles. Bearing in mind that the machine is a twin-float seaplane that is a figure which speaks well for the aerodynamic efficiency. One needs but to look at *Mercury* from in front to realise how extremely small is the frontal area. Obviously, had the machine been a landplane with retractable undercarriage the cruising speed would have been a great deal higher, but Imperial Airways wanted a seaplane because of the Azores-Bermuda route.

Allowing for the fact that the designers were probably deliberately conservative when they estimated the cruising speed at 165-170 m.p.h., it is still surprising that this figure should have been exceeded by nearly 20 m.p.h. A close inspection of the machine indicates that the sheet-metal covering is very smooth indeed, and doubtless this has contributed materially to the very good speed attained. One cannot, however, help feeling that the small frontal area of the Napier-Halford Rapier engines, aided and abetted by a very neat cowling, has a good deal to do with the low drag.

This is the first occasion on which one has had an opportunity to get figures concerning a machine fitted with Napier engines in the wing, and it is extremely encouraging to find that these units lend themselves so well to mounting on the leading edge. Their symmetrical shape is particularly appropriate to this type of mounting, and their small frontal area necessitates cutting-up the wing to only a very small extent. A top speed in excess of 200 m.p.h. must be regarded as remarkably good for a seaplane fitted with engines totalling but 1,280 h.p. or so. With these figures established, and only the actual operation of upper and lower components as a biplane, with the separation in flight to follow, there is every reason to assume that the



A perfect landing: Without trailing-edge flaps the speed is not excessive, even with the load carried when this picture was taken. (*Flight* photograph.)

carriage of mails over long distances at high route speeds will become an economically possible undertaking in the near future.

Mercury is, of course, of all-metal construction, with a smooth-skin streamline fuselage, and wings with similar covering and an internal structure somewhat similar to that of the Empire boats. An interesting feature is the main fuel tank, which is in the form of a long tube running through the centre of the spar girder and attached to it in such a way as to reinforce the spar and adding considerably to its torsional rigidity. Baffles are, of course, fitted; one might call them bulkheads, as they are fitted with flap valves which permit the fuel to flow from the tips towards the centre, but not in the opposite direction. This tubular tank extends outwards to beyond the outer engines. The total capacity is 1,200 gallons, and no petrol is carried in the fuselage, which is, therefore, available for the 1,000 lb. pay-load and crew of two.

The fact that *Mercury* will be assisted to its operational height is reflected in the weight figures. The gross weight is 21,000 lb., and as 1,200 gallons of petrol will weigh approximately 9,000 lb., and a pay-load of 1,000 lb. has to be carried, it will be seen that the machine carries *rather more than its own weight* as disposable load, the weight of the crew having to be deducted from the 10,000 lb. to get the tare weight. Bearing in mind the fact that the machine is a seaplane, that is a remarkably good ratio, and undoubtedly it could be considerably improved by making the upper component a landplane and increasing the wing loading from the 34½ lb./sq. ft. or so of *Mercury* to 45 lb./sq. ft.

Although rather dwarfed by comparison with *Maia*, the lower component, *Mercury* is by no means a small aircraft. With an overall length of 51 ft. and a wing span of 73 ft., it has a wing area of 611 sq. ft. and a height, from the steps of the floats to the top of the rudder fin, of 20 ft. 3 in. The float track is 14 ft. 6 in.

The Napier-Halford Rapier engines fitted in *Mercury* are of the Mark V series, which are supercharged to 13,000 ft., at which height the maximum power is 340 b.h.p. at 4,000 r.p.m. The normal output is 315 b.h.p. at 3,500 r.p.m. and 10,000 ft.

Salamander Suits for the Service

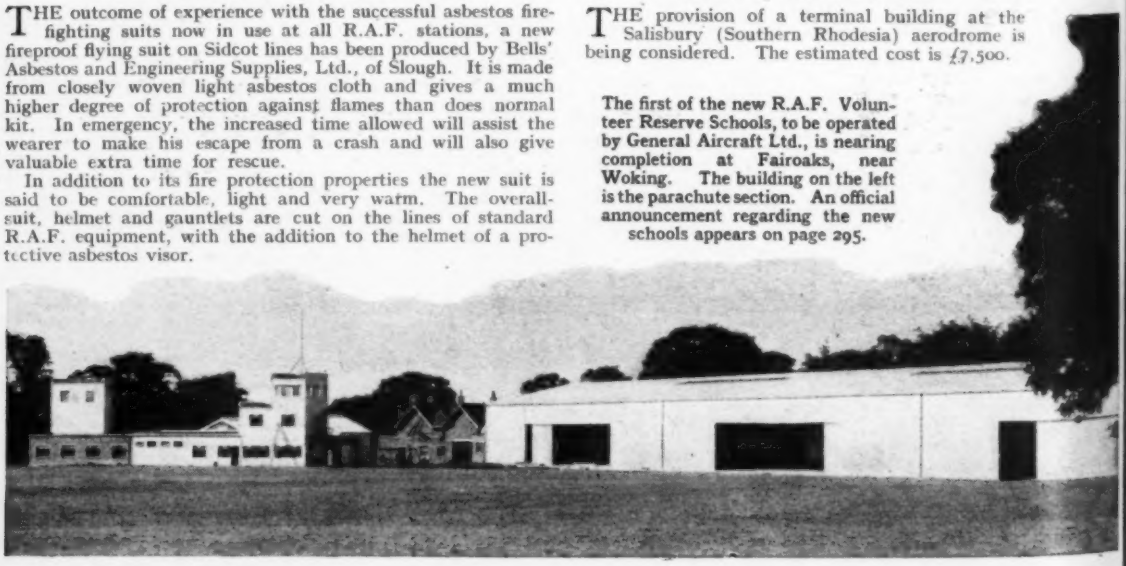
THE outcome of experience with the successful asbestos fire-fighting suits now in use at all R.A.F. stations, a new fireproof flying suit on Sidcot lines has been produced by Bells' Asbestos and Engineering Supplies, Ltd., of Slough. It is made from closely woven light asbestos cloth and gives a much higher degree of protection against flames than does normal kit. In emergency, the increased time allowed will assist the wearer to make his escape from a crash and will also give valuable extra time for rescue.

In addition to its fire protection properties the new suit is said to be comfortable, light and very warm. The overall-suit, helmet and gauntlets are cut on the lines of standard R.A.F. equipment, with the addition to the helmet of a protective asbestos visor.

Salisbury Branches Out

THE provision of a terminal building at the Salisbury (Southern Rhodesia) aerodrome is being considered. The estimated cost is £7,500.

The first of the new R.A.F. Volunteer Reserve Schools, to be operated by General Aircraft Ltd., is nearing completion at Fairoaks, near Woking. The building on the left is the parachute section. An official announcement regarding the new schools appears on page 295.



CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

WATCHING THE WHEELS GO ROUND

REMARKS on page 120 of the July 29 issue of *Flight* suggest a point which I should very much like to see discussed by "Indicator," or one of your other experts. Why do not manufacturers arrange, whenever possible, for the pilot to have a direct view of his wheels? I remember once being able to save damage because, flying a one-and-a-half-strutter from the front seat, I was able to see that one wheel had been wrecked by hitting a bump just after taking off. It seems a fairly simple thing for a manufacturer to arrange, and it might save many crashes.

Another point—in your issue of March 18 you described two machines of the very greatest interest, the Hordern-Richmond and the Baynes Bee. These designs are certainly heading the right way by bringing multi-engined reliability into the light aeroplane class. But you have told us nothing about them for months. Please give us some news of these whenever possible.

Finally, may I thank you for producing quite the most interesting periodical which reaches this part of the world?

Agra, India. G. W. SMART.

[At the moment there is very little to say about the two machines mentioned. The Hordern-Richmond Autoplane is still under development, and should shortly be in production; and work on the Baynes Bee is, at least for the present, in abeyance.—ED.]

NAVIGATIONAL NICETIES

I HASTEN to correct two entirely erroneous impressions which my letter in the issue of August 12 appears to have given Mr. Williams:—(1) That geometry is taught to students attending the Imperial School of Air Navigation and (2) that I despise marine navigation instructors.

With regard to (1), my experience may differ from that of Mr. Williams, but up to now I have found that my students have learned geometry at school. I merely teach them the application of geometry to certain problems in air navigation, and (2), I have every respect for marine navigation instructors—except when some of them become dogmatic and attempt to teach air navigation instructors their business.

I had already anticipated Mr. Williams' advice to consult my assistant instructor (who, incidentally, holds the highest possible qualification in marine navigation), and he had informed me that a very large percentage of practical marine navigators who come ashore in order to pass various Board of Trade examinations in the theory of their profession throw away their text-books when they return to sea, and cheerfully forget ninety per cent. of the knowledge they have accumulated at the marine navigation schools. This does not in any way detract from their efficiency at sea.

The fact that during a recent flight by Mr. Williams in a Service machine suitably equipped with a chart table the "running fix" was used with success does not in any way dispose of the arguments I advanced in my letter in the issue of August 12. I can only presume that these "running fixes" were plotted by a navigator who had nothing else to do, but I wonder what would have happened if the pilot had been the sole member of the crew with his whole time devoted to piloting a heavily loaded machine through cloud or fog? I also wonder how many "running fixes" Mr. Williams could have plotted whilst acting as Officer of the Watch at sea if during the whole of that watch he had had to hang on to the wheel in dirty weather.

Mr. Williams, deliberately or otherwise, ignores the totally different classes of problems in air navigation encountered by the second-class air navigator and the first-class air navigator. The former (who nearly always flies as a pilot-navigator) has had to learn "comic" methods of air navigation which are of no practical use, or, alternately, which he would never have an opportunity of using in the air. Why waste time teaching him this mass of useless knowledge? On the other hand, the first-class air navigator (a very rare bird at the moment) will on long-distance flights have more varied problems to solve, necessitating a thorough grounding in the practice and theory of air navigation.

Mr. Williams is quite wrong in his statement that the Air Ministry believes in the necessity of mastering the theory before attempting to put it into practice. On the contrary, the Air Ministry rightly insists that the air navigator must have at least three hundred hours' flying experience covering a period of two years before a second-class navigator's licence is granted

While I am pleased to see that Mr. Williams agrees with me that experience in practical air navigation will never be obtained on the ground, I cannot agree with his dogmatic statement: "Thoroughly equip the navigator with the theory and he will be all the more readily able to put it into practice."

The modern pilot-navigator has quite enough to do to learn the practical side of his work without his brains being clogged with a mass of useless theory, however interesting this theoretical knowledge may be from a merely academical point of view.

I am afraid that I should take up far too much valuable space if I were to accept Mr. Williams' challenge to enumerate the "hidebound marine methods" to which I object, but the following example will, I think, serve to illustrate my point.

I have in front of me as I write a modern set of air navigation tables occupying only eighty-five pages, but covering all reasonable problems which are likely to be encountered by the first-class air navigator in any part of the world. The equivalent set of nautical tables occupies six hundred and thirty-eight pages.

London, W.11. C. W. MARTIN,
Imperial School of Air Navigation.

[This correspondence (which, we trust, has proved informative to navigation instructors, if not to their pupils) must now be terminated.—ED.]

ALPINE EULOGY

MANY aviators must be dreaming of the delights of flying in Switzerland. To all such let me recommend unreservedly the aerodrome of Berne-Belp Moos. The new buildings provide lots of room for civil aeroplanes; the staff is most considerate and efficient, with the sterling qualities for which the Swiss have been always famous. The scenery is of the first order (half an hour and you are floating beside the Jungfrau or over Interlaken), and the position a central one for a hundred wonderful excursions. I am dropping anchor here myself and advise others to do the same. There is no flying like this in the rest of Europe, not even in the Tyrol.

Berne. DOUGLAS FAWCETT.

[King's Cup pilots who feel they have not seen enough mountains may care to take the advice of Mr. Fawcett—who is a Hornet Moth private owner, and who recently celebrated his 1st birthday by passing Heston's aerobatic course.—ED.]

Forthcoming Events

September 18. North of Ireland Aero Club: Ulster Air Rally, Newtownards.
September 18. Eastbourne Flying Club: At Home.
September 23. Aero Golfing Society: Cellon Trophy.
September 25. South Coast Flying Club: Annual Dinner and Dance, Grand Hotel, Brighton.
October 2-18. Milan Aero Show.
October 6. R.Ae.S. (Weybridge Branch) Lecture: "Bird Flight," by Capt. J. Laurence Pritchard. Vickers Works, 6.15 p.m.
October 14. R.Ae.S. Lecture*: "The Hafner Gyroplane," by Mr. R. Hafner.
October 21. R.Ae.S. Lecture*: "Practical Airscrew Performance," by Mr. F. M. Thomas.
November 4. R.Ae.S. Lecture*: "Problems of High-Speed Flight as Affected by Compressibility," by Mr. C. N. H. Lock.
November 18. R.Ae.S. Lecture*: "The Take-off Problem," by Mr. H. F. Vessey.
December 2. R.Ae.S. Lecture*: "Wing Surface Controls with Reference to Possible Developments in Flying Technique," by Flt. Lt. H. P. Fraser.
December 16. R.Ae.S. Lecture*: "Development of Sailplanes," By Sqn. Ldr. G. M. Buxton.

1938.

January 13. R.Ae.S. Lecture*: "Radio as a Direct Aid to Landing Approach," by Sqn. Ldr. R. S. Blucke.
January 27. R.Ae.S. Lecture*: "Electrical Ignition on Aero Engines," by Dr. G. E. Bairstow.
February 3. R.Ae.S. Lecture*: "Recent Research into the Aerodynamic Characteristics of Aircraft," by Mr. E. F. Relf.
February 17. R.Ae.S. Lecture*: "The Maintenance of Civil Aircraft," by Mr. H. L. Hall.

* All these lectures take place at the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, London, S.W.1, beginning at 5.30 p.m.

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS — AIR MINISTRY ANNOUNCEMENTS

A HIGHER APPOINTMENT

The Air Ministry announces that Air Commodore Thomas Edward Barham Howe, C.B.E., A.F.C., is appointed Senior Air Staff Officer and temporary Air Officer Commanding No. 12 (Fighter) Group, Royal Air Force, in October, 1937, vice Air Commodore John Hugh Samuel Tyssen, M.C.

Air Commodore T. E. B. Howe was commissioned in the Royal Naval Air Service as a Flight Sub-Lieutenant in 1916, having served in the Australian Imperial Force since October, 1914; and for valuable flying services rendered during the Great War was awarded the Air Force Cross, as well as being mentioned in despatches. In 1919 he was granted a permanent commission in the Royal Air Force with the rank of Flight Lieutenant.

From September, 1919, until January, 1923, he served at the School of Air Pilotage, and for valuable flying services at the School, was awarded a bar to the Air Force Cross in the New Year Honours List, 1923. After a year in command of No. 32 Squadron, Air Comdre. Howe passed a course at the Royal Air Force Staff College. In January, 1929, he was appointed commandant of R.A.F. Station Headquarters, Northolt; and later that year was appointed to command No. 203 (Flying Boat) Squadron in Iraq. After his return to the United Kingdom in 1930, Air Comdre. Howe was employed on Air Staff duties in the Directorate of Training at the Air Ministry until September, 1933, when he was posted to Headquarters Fighting Area as Officer-in-Charge of Administration, and later as Senior Equipment Staff Officer. Since September, 1935, Air Comdre. Howe has held the appointment of Air Attaché at Washington. In the New Year Honours List, 1936, he was appointed a Commander of the Order of the British Empire.

He was promoted Squadron Leader in 1924, to Wing Commander in 1928, to Group Captain in 1933, and to his present rank on July 1, 1937. He acted as additional Air Aide-de-Camp to His late Majesty King George V from January, 1934, until August, 1935.

SPECIALIST ARMAMENT COURSE

The undermentioned officers, having successfully completed the specialist armament course at the Air Armament School, Eastchurch, which terminated on July 2, are granted the symbol "A":—

Sqn. Ldr. G. C. Stemp; Flt. Lts. H. R. Allen, A. McD. Bowman, W. R. Brotherhood, L. Coulson, B. A. J. Crummy, E. B. C. Davies, H. W. Dean, M. H. Dwyer, C. F. S. Fraser, A. Golding, E. G. Granville, C. R. D. L. Lloyd, G. E. Macdonald, G. P. Macdonald, S. P. A. Patmore, R. A. R. Rae, J. M. Warfield.

The undermentioned officers also successfully completed the course:—Flt. Lts. W. A. Jones, Royal Canadian Air Force, and I. J. Lightfoot, Royal Australian Air Force.

AIR FORCE LIST

The September issue of the *Air Force List* has now been published. It can be purchased (price 3s.) from H.M. Stationery Office at the following addresses: Adastral House, Kingsway, London, W.C.2; 120, George Street, Edinburgh; 2, York Street, Manchester; 1, St. Andrew's Crescent, Cardiff; 15, Donegall Square, Belfast; or through any bookseller.

AIRCRAFT APPRENTICES AND BOY ENTRANTS WANTED

Early next year 1,300 well-educated boys will be entered for trade training in the Royal Air Force; of these 900 will be entered as aircraft apprentices, and the remaining four hundred as boy entrants. The age limits for aircraft apprentices are 15 to 17 and for boy entrants 15¾ to 17¼.

Full information can be obtained free on application to the Air Ministry (Dept. I. of R.), Kingsway, London, W.C.2.

BOMBING THE FLEET

Last week as part of the Home Fleet passed from its home ports to Invergordon certain R.A.F. squadrons of the Coastal Command were exercised in locating it and attacking the ships as they steamed up the East Coast about 100 miles out from Felixstowe. The squadrons engaged were: No. 209 (Flying Boat) Squadron, a composite squadron formed from boats of No. 210 and 228 (F.B.) Squadrons, and Nos. 206, 217, 269 and 233 (General Reconnaissance) Squadrons. The exercise continued until the ships had passed Berwick-on-Tweed.

COMMISSIONED ENGINEER AND SIGNALS OFFICERS

The undermentioned warrant officers have been granted permanent commissions:—

As Commissioned Engineer Officers:—W. J. S. Barnard, P. G. G. Begrie, R. L. Bell, J. Bradshaw, J. S. Brett, A.F.M., H. E. Brushwood, H. Cadman, A.F.M., F. H. Catton, I. F. Chambers, N. L. Claxton, A. E. Clayson, A. Clifton, L. Davey, A.F.M., A. E. Davies, D. J. Day, S. G. Dean, N. W. Fredrick, W. R. Frost, R. D. Gough, G. H. Harrison, R. Herrick, L. G. Hucker, E. D. Jackson, A. B. Kendall, F. A. Kirk, W. McCarthy, A. Marks, F. F. S. Mattingley, H. O. B. Mawdsley, M. F. G. Mill, D.F.M., H. L. Millyard, M. W. Moore, W. Moore, H. Myles, A.F.M., E. R. Paley, A. J. V. Parish, A. E. Pearce, P. H. Scoley, W. J. Scrivener, W. Squires, F. Stevens, C. L. Trevithick, B. A. Vautier, W. Webster, M.B.E., A. G. Williams, F. J. A. Willis, C. H. Wilson.

As Commissioned Signals Officers:—F. H. V. Gould, A. E. Hester, H. H. Laurie, J. Lindsay, W. R. Lockhart, E. W. Long, D. McLaren, V. G. Macario, H. J. Maxted, J. A. C. Pride, A. D. Rutherford, D.F.M., J. S. Smith, M.B.E., J. H. Styles, W. E. Wendon, J. Woods.

FLYING ACCIDENTS

The Air Ministry regrets to announce the following accidents:—

A.P/O. Danford Laycock Marsh-Smith lost his life in an accident which occurred at Hodnet, Salop, on September 9, to an aircraft of No. 10 Flying Training School, Tern Hill. He was the pilot and sole occupant of the aircraft.

A.P/O. George Lofty Fraser lost his life in an accident which occurred at Abu Sueir on September 10 to an aircraft of No. 4 Flying Training School, Abu Sueir, Egypt. He was the pilot and sole occupant of the aircraft.

ROYAL AIR FORCE GAZETTE

London Gazette, September 7, 1937

General Duties Branch

The following Pilot Officers on probation are confirmed in their appointments on the dates stated:—W. T. Dennis (May 21); D. P. Bamber (July 24); J. N. Culverwel, D. S. Forsyth (August 22).

The following Acting Pilot Officers on probation are confirmed in their appointments and graded as Pilot Officers on the dates stated:—G. C. C. Bartlett, J. C. Burge, C. E. A. Garton, L. C. Mitchell, M. J. S. Newman, J. G. H. Potter, M. O. Scott (June 29); K. W. C. Bindloss, H. D. Green (July 3); R. N. Bateson, R. H. Batt, A. J. Carver, J. L. Robinson, S. G. Wise (July 13).

Acting Pilot Officer on probation B. B. Willmott is graded as Pilot Officer on probation with effect from May 4 and is confirmed in his appointment with effect from June 2; Acting Pilot Officer on probation C. S. Thomas is graded as Pilot Officer on probation with effect from May 4 and is confirmed in his appointment with effect from June 8.

The following Acting Pilot Officers on probation are graded as Pilot Officers on probation with effect from May 11, and are confirmed in their appointments with effect from June 8:—R. D. Baughan, N. C. Beck.

Acting Pilot Officer on probation W. S. L. Smallman is graded as Pilot Officer on probation with effect from May 18 and is confirmed in his appointment with effect from June 15; Lt. J. C. H. Price, R.N., Flt. Lt., R.A.F., ceases to be attached to the R.A.F. with effect from July 10 on return to Naval duty, and is reattached to the R.A.F. as a Flight Lieutenant with effect from July 28 and with seniority of July 1.

Equipment Branch

Flying Officer on probation L. Mitchell is confirmed in his appointment (August 28).

Accountant Branch

Pilot Officer on probation K. M. Crick is confirmed in his appointment and promoted to the rank of Flying Officer (June 12).

PRINCESS MARY'S ROYAL AIR FORCE NURSING SERVICE

Sister Miss M. G. Wiseman, A.R.R.C., is placed on the retired list on account of ill-health (June 30) (substituted for notification in *Gazette* of June 29).

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

The notification in the *Gazette* of December 3, 1935, concerning Pilot Officer Eric Sprawson is cancelled.

NOMENCLATURE OF AIRCRAFT

The name of the Blackburn dive bomber fighter aeroplane fitted with Perseus engine is Skua I.

R.A.F. VOLUNTEER RESERVE

Arrangements have been completed for the entry of personnel for training as pilots in the Royal Air Force Volunteer Reserve, at aerodromes at Barton (Manchester), Fairoaks (near Woking), Gravesend and Gatwick, and applications are invited immediately from candidates resident in the districts served by those centres, namely, Manchester and London. Training centres have already been established in the Birmingham, Bristol, Brighton, Coventry, Glasgow, Hull, Leicester, London, Northampton, Perth, Reading and Southampton districts, and applications are also invited from candidates in those districts. The flying training centres already in operation in the London district are at Hanworth, Hatfield, Redhill and White Waltham aerodromes.

Candidates must be between their 18th and 25th birthdays, be physically fit and have had an education approximately up to the standard of the School Certificate. Previous flying experience is not necessary. Applications should be sent to the Superintendent of Reserve, Royal Air Force, Hendon, The Hyde, London, N.W.9. Selected candidates will be enlisted as airman pilots with the rank of Sergeant; later they will have opportunities of promotion to commissioned rank, on merit.

The initial period of service will be five years and pilots will have the opportunity of extending their service at the end of that period. Candidates must be able and willing to attend for training at week-ends and in the evenings. They will also be required to attend for 15 days' continuous training annually at times which, as far as possible, will be arranged to suit the convenience of individual pilots.

Provided they carry out the training required of them and reach the required standard of proficiency, pilots will receive a retaining fee of £25 a year. Pay and allowances will be given for periods of continuous training and an allowance to cover out-of-pocket expenses incurred in training at other times. Travelling expenses will be refunded.

CIVIL EMPLOYMENT OF EX-AIRMEN

With a view to assisting airmen to obtain civilian employment, arrangements have been made with the Ministry of Labour whereby those desiring such assistance may be given advice by officials of that department prior to discharge or transfer to the Reserve. In many cases airmen, particularly those in skilled trades, will be able to secure suitable employment immediately on leaving the service but, in approved cases, training courses will be arranged by the Ministry of Labour designed to enable airmen who are unable to secure suitable employment in civil life to enter and qualify for advancement in such employment. These training arrangements will include trade courses for unskilled airmen and airmen whose air force trade has no equivalent in civil life and also, where this is judged advantageous, courses for skilled tradesmen to enable them to adapt themselves to the conditions existing in civil industry. The Ministry of Labour will be prepared in special cases to accept airmen who do not apply for a course immediately on leaving the service but who subsequently desire to receive such a course.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Squadron Leaders.—C. P. Brown, D.F.C., to R.A.F. Station, Catterick; to command, 30.8.37. J. H. Pool, to R.A.F. Station, Canwell, 30.8.37.

Flight Lieutenants.—R. Faville, R. G. Shaw and J. H. A. Chapman, to R.A.F. Station, Gosport, 30.8.37. G. L. Best, to R.A.F. Station, Dishforth, 30.8.37. N. C. S. Rutter, to R.A.F. Station, Harwell, 30.8.37. A. Pyke, to R.A.F. Station, Wyton, 30.8.37. P. Bathurst, to No. 62 (B.) Squadron, Cranfield, 30.8.37. E. R. Pearce, to No. 19 (F.) Squadron, Duxford, 30.8.37. W. L. Houlbrook, to No. 1 Flying Training School, Leuchars, 30.8.37. W. A. Richardson, to No. 3 A.A.C. Unit, Kalafrana, Malta, 16.8.37. H. S. Laws, to Headquarters, No. 5 (B.) Group, Mildenhall, 26.8.37.

Pilot Officers.—J. R. I. Bell, H. J. Garlick, A. R. L. Griffiths, W. M. Penman, to No. 801 (F.F.) Squadron, 24.8.37.

Acting Pilot Officers.—The following are posted to No. 3 Flying Training School, South Cerney, with effect from 21.8.37:—J. M. Pryde, M. L. Birch, D. A. Fordham, C. F. Gibson, C. B. Jordan, J. F. Roberts, H. V. S. Todd, P. Fish, R. T. P. Davidson, I. M. Fraser, R. L. Glyde, J. H. Laughlin, D. I. McMonnies, G. Robinson, J. H. G. Walker, J. C. Gates, R. A. Green, G. R. Leatherbarrow, G. S. Richardson, W. A. Smith, C. L. Taylor, and E. R. Berry.

Medical Branch

Group Captain.—A. Grant, M.B.E., to Directorate of Medical Services, Air Ministry; for Staff duties, 1.9.37.

Wing Commanders.—R. S. Overton, to No. 2 Flying Training School, Digby; for duty as Medical Officer, 30.8.37. E. N. H. Gray, to No. 10 Flying Training School, Tern Hill; for duty as Medical Officer, 1.9.37.

Equipment Branch

Wing Commander.—F. N. Trinder, to R.A.F. Station, Cardington; for Equipment duties, 18.8.37.

Flight Lieutenant.—E. N. A. Crowe-Browne, to R.A.F. Station, Turnhouse, 18.8.37.

Accountant Branch

Flight Lieutenant.—C. E. Ashton, to R.A.F. Station, Calshot, 23.8.37.

Chaplains Branch

Revd. R. S. Wilkie, to R.A.F. Depot, Middle East, Aboukir, Egypt; for duty as Chaplain (C. of E.), 23.8.37.

WING COMMANDERS HILTON AND SHERREN

AS Lord Swinton said in his King's Cup presentation speech at Hatfield on Saturday, the death in the race of Wing Commanders E. G. Hilton, D.F.C., and P. C. Sherren, M.C., has deprived the Royal Air Force of two officers which it could ill afford to lose.

Wing Cdr. Hilton, who was 42 years of age, transferred to the R.F.C. from the Infantry in 1917. In 1919-23 he was with Nos. 58 and 70 Squadrons in Egypt and Iraq. He came home for a spell of service at Martlesham and then, in 1929, went out for a further five years to Egypt with No. 216 (Bomber Transport) Squadron. From there he returned to Martlesham, where he became one of the most brilliant pilots of that famous experimental station. Recently he received an Air Ministry appointment in the Department of the Air Member for Research and Development. He had five thousand hours flying experience. Last year he flew an Airspeed Envoy out to the Cape and came back in a time which, but for a delay at Athens, would have broken the existing record.

Wing Cdr. Sherren, who was 44, was a Canadian officer who was seconded to the R.F.C. in 1916 and was granted a permanent commission in the R.A.F. in 1919. In 1920-22 he was in India, where he gained the India General Service medal, with clasp, for the Waziristan operations. He was promoted Wing Commander in 1930, and for three years commanded No. 10 (Bomber) Squadron. In 1934 he was appointed to the command of No. 1 Armament Training Camp at Catfoss, in 1934, and later he was transferred to the Home Aircraft Depot at Henlow for administrative duties. He was placed on the retired list in June, 1936.

Wing Cdr. Hilton leaves a wife and son, and Wing Cdr. Sherren a widow. With these and their other relatives *Flight* expresses the deepest sympathy.

Structural Methods

"Metal Aircraft Construction," by M. Langley, 15s., Sir Isaac Pitman and Sons, Ltd.

REVISED, enlarged and embracing some of the latest structural methods, the third edition of this valuable and absorbing work does even more than its predecessors to enhance Mr. Marcus Langley's reputation as an astute observer of international methods in the construction of metal aircraft. Stressed skin, as applied to wings and fuselages, is naturally given greater consideration than previously, and a representative variety of retractable undercarriages is reviewed. As the publishers claim, the work will undoubtedly interest primarily the draughtsman engaged on detail design, at the same time providing a sound background to the practical work of specialists in stressing and aerodynamics. It is safe to assume that by now the book is to be found in the design departments of the majority of constructors.

Although certain foreign manufacturers have been reluctant to provide material the claim that the work is international in scope is well founded and is borne out by the subjects treated.

It is gratifying to see reviewed some of the more recent British practices, in particular the Westland single-spar system of wing construction as applied to the Lysander.

A big proportion of the material embodied has already appeared in *Flight*, but this, of course, does not detract from the value of the work as a concise reference book and the basis for a most thorough study.

The Successful Ones

THE following candidates have passed the July examination for the Second Class Navigators' Licences:—

Angell, E. E. M.; Baggulay, R. B.; Bailey, A.; Brodie, I. M.; Burrows, H. S.; Charsley, J. H.; Clayton, G. T. B.; Craig, W. J.; Davies, D.; Dilnot, A. A.; Donaldson, G. F. K.; Hankey, O. C. A.; Houston, W. B.; Hunt, V. A. M.; Hurst, R. G.; Kernaghan, S. H.; List, I. H.; McFadden, R. D. B.; McIntosh, R. H.; Newman, H. D.; Palmer, E. F.; Podevin, C.; Pudney, W. G.; Ray, V.; Satherley, G.; Simpson, W.; Stern, J. D.; Thomas, A. W. S.; Turner, C. A.; Walsh, C. J.; and Wells, J. L.

Ninety-three entrants sat for the examination, the next will be held during the week commencing October 18.

The TREND of INVENTION

Recent Aeronautical Patents Reviewed

Oleo-Pneumatic Strut

MANY shock absorbers of this type are known. The two working media are oil and air, the oil providing the necessary damping factor and the air the resilient factor. The degree of resilience is determined by the volume and pressure of air and the damping by the restriction to the flow of the oil.

In order to obtain a strut that will meet greatly varying conditions of service, it is proposed in this patent to have a single piston acting in a cylinder filled with oil, and which is connected to two other cylinders each partly filled with oil and partly with compressed gas. Floating pistons are fitted in these auxiliary chambers and these completely separate the air and the oil. The flow of oil in these cylinders is controlled by valves, which are arranged to open at different pressures so that normal light loads are taken entirely by the air in one cylinder, whilst heavier shocks are resisted by the air in both the auxiliary cylinders. Various types of arrangements are shown, in some of which the air chambers are located within the main tube of the strut.—*Patent No. 463059: P. P. H. Bille.*

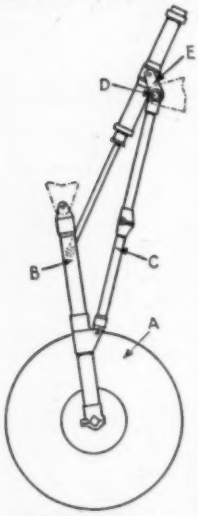
Undercarriage Locking

A METHOD of locking a retractable undercarriage when it is in the extended position is described in this patent and the arrangement used is shown in the accompanying illustration.

The wheel A is mounted between a pair of shock-absorber struts B which are pivoted at their upper ends to the fuselage of the aircraft.

Two jointed struts, one of which is shown at C, extend between a lug carried on each of the shock-absorber struts and a cross rod D, journalled on the aircraft. The operating jack is mounted so that its cylinder is carried by a pair of arms E, which are rigidly attached to the rod D while the end of its plunger is coupled to the cross bracing connecting the two shock absorber struts.

In the extended position the hinge between the two portions of the jointed struts is slightly beyond the centre line so that the compressive stresses in this member of the linkage have no tendency to collapse it. When it is desired to retract the undercarriage the initial movement of the jack rotates the arms E, thereby breaking the struts C and allowing it to fold, and continued movement of the jack causes retraction to take place.



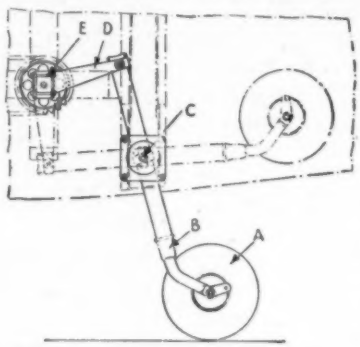
A Bristol under-carriage-locking scheme.

The advantage of this arrangement is that the action of the jack is effective to begin the collapse movement of the jointed strut and, further, the action of the jack on the other link is such as to have a high mechanical advantage.

A second patent granted to the same Company deals with the hydraulic operating system of a retractable undercarriage, and can be embodied in the system just described. Arrangements are provided whereby the jack is prevented from operating so long as the undercarriage is locked in either extreme position, since the jack is cut off from the pressure-creating device until the lock is released. This result is achieved by forming the jacks which release the locks as piston valves in the main operating circuit.—*Patents Nos. 463807 and 464144: Bristol Aeroplane Co., Ltd., and R. Ponting.*

Retracting Gear

A RETRACTING gear which is primarily intended for tail wheels but which can be applied to wireless masts and other parts which need to be retracted wholly or partly, is described in this patent, and the novel feature is the use of a crank mechanism and the dead centre locking in the extreme positions.



Retracting gear with various applications—another Bristol patent.

The wheel A is carried in a fork B at the end of a strut which is pivoted at its central point C to the aircraft structure. A crank arm D is capable of rotation about one end E by means of a chain or other operating gear and it carries at its free end a collar which slides on the strut supporting the wheel. When this crank arm rotates the collar slides along the strut and at the same time turns the latter about its central pivot point. In the extreme positions the strut and crank are substantially at right angles to each other so that the mechanism is locked against movement due to any forces acting on the wheel.

It is suggested that this tail wheel retracting gear may be interconnected with the retracting gear of the main landing wheels.—*Patent No. 465278: Bristol Aeroplane Co., Ltd., and L. G. Frise.*

Servo-flap control is the subject of a Short Bros. patent.

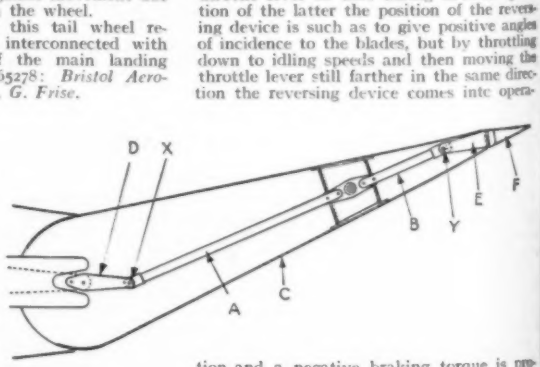
Servo Flaps

A MECHANISM is described for automatically transmitting movement to a servo flap when the main surface is operated, the whole of the mechanism being housed in the main control surface.

A two-armed lever A-B is pivoted inside the main control surface C and one end of the lever engages with a fixed arm D which is carried by the fixed surface to which C is pivoted. The other end engages with another fixed arm E which is rigid with the servo flap F. This servo flap is pivoted on the rear edge of the main control surface C.

Since the pivot X is to the rear of the axis, about which the main surface turns, and the point Y is forward of the axis, about which the servo flap turns, movement of the main surface causes the lever A-B to turn about its pivot and so tilt the servo flap in the opposite sense to the movement of the main surface.

The ends of the lever are slotted so as to allow a slight longitudinal movement when necessary.—*Patent No. 464184: Short Bros. (Rochester and Bedford), Ltd., and D. Lloyd Parkes.*



Improved Altimeter

AN altimeter of the barometric type depends upon the atmospheric conditions existing on the ground, and it is usual to set the altimeter to zero before leaving the ground so that it will then read correctly for the conditions then existing. If these conditions change, as they may well do, during a long flight, then the altimeter will not be accurate unless it is reset.

It is proposed to correct the altimeter automatically by wireless transmissions from various stations so that it is always set in accordance with the atmospheric conditions prevailing at the nearest station.

The frequency of the transmitted signals is varied in a definite manner, depending on the changes in the atmospheric conditions, and the receiving apparatus on the aircraft has two resonant devices tuned to the maximum and minimum frequencies of the agreed range so that these resonant devices have oppositely sloping characteristics for frequencies within this range. The outputs of the resonant devices are rectified and are then applied in opposite senses to a reversible motor acting on the scale of the altimeter so that the latter is moved in accordance with the frequency of the waves received.

The motor also operates a tuning device in the receiver circuit to tune it to the particular frequency that is being transmitted.—*Patent No. 465787: J. Robinson.*

Braking Effect for V.P. Airscrews

IT has previously been proposed to vary the pitch of the blades of an airscrew so that they are set at a negative angle of incidence and under these conditions, when driven by the engine, they will exert a negative thrust, thereby checking the machine and acting as a brake. The present patent is concerned with a change-over device which gives automatic control of the blades both for positive and negative angles.

The essential features are a governor device which is influenced by engine speed and connected to the pitch-changing control, and in addition there is a reversing device which alters the direction in which the blade pitch is changed.

The reversing device is coupled to the throttle lever so that during normal operation of the latter the position of the reversing device is such as to give positive angles of incidence to the blades, but by throttling down to idling speeds and then moving the throttle lever still farther in the same direction the reversing device comes into operation and a negative braking torque is produced when the engine is again speeded up.

The governor acts to maintain a constant airscrew speed throughout the whole operative range. The detailed manner in which these results are obtained is described in the specification.—*Patent No. 465571: Junkers Flugzeug-und-Motorenwerke Aktiengesellschaft.*

September in the Rain: The King's Cup machines were wheeled into the De Havilland erecting shops to afford shelter to the associated humanity during Thursday's downpour. (*Flight* photograph.)

Topics of the Day

Bumps

THE severe buffeting experienced by the King's Cup competitors on certain sections of the course, as well as Friday's tragedy, has brought the belt question up again. It is significant that the pilots of the very fast machines did not complain overmuch—either because sheer speed reduced the bumps to a series of hammering shocks, or because these machines had full aerobatic harness.

Obviously, it would be a great inconvenience if we were all forced to wear such harness in cabin machines (the greatest advantage of which is that one need not dress for the part), but I should certainly rig up something of the kind if I were going to fly a matter of 1,400 miles at full throttle and zero altitude. I am, in any case, a belt user, even when flying in transport aeroplanes, since there is nothing so unpleasant as being forcibly removed from the controls and being banged against the roof when one is flying oneself, or hitting one's head against the luggage rack and losing one's book when flying as a passenger.

Unfortunately, the ordinary thigh strap, or tummy belt, is not usually sufficient to prevent quite considerable movement, though these will help. More than once, in the ordinary course of here-to-there flying at cruising speed at a reasonable height and with a strap attached, I have knocked my head against a hard roof member; only the possession of an exceptionally hard skull may have saved me from the unfortunate consequences of temporary unconsciousness on one of these occasions.

Temporary Harness

WHAT is wanted for cabin machine use is some kind of quickly attached harness which holds one more firmly than the ordinary thigh belt, and which can be coupled or uncoupled with ease while the machine is actually flying. Aerobatic harness is not only a considerable bother, but, if it is to do its work at all, must be so tight that reasonable movement is restricted.

Surely it would not be beyond the ingenuity of some person or persons to devise a form of emergency harness with a single attachment and which will not be in the way on occasions when the thigh strap is sufficient. The latter might even be incorporated in the harness in such a manner that it could be used by itself for normal flying while the rest of the attachment is neatly stowed so that it cannot be painfully sat on, and so that it is immediately available when flying through a really bumpy area. In such circumstances rudder pedal straps are not without their value, though the majority of pilots dislike them for one reason or another.

Whatever straps or harnesses are available, these should be more get-at-able than they usually are. When, on occasion, one leaves the ground without tying oneself in, it is the very dickens of a job finding the loose ends if these are wanted after all. It is necessary, in fact, to stand up on the rudder pedals while one's passenger pulls the ends up from a position beside or beneath the seat—usually providing you, eventually, with a couple of odds—one of his and one of yours. The process must then be repeated while the machine dashes foolishly about the sky and while the occupants' heads are dashed with equal foolishness against the roof. None of which is quite so funny at low altitudes. Admittedly, the use of any form of strap or harness tends, in the mind of the ordinary person, to keep flying on the circus footing from which it has suffered for so many years, but a really well-designed harness should be quite unobtrusive when it is not wanted.

The motorist does not require to be strapped down like a dangerous lunatic? No, but he would probably prefer to be so attached for his own security if a large and firmly mounted wheel was not being held in his lap.

Runaways

AT least once a year every club appears to experience, in greater or lesser degree, the runaway aeroplane adventure. Since two extremely large and well-run clubs have, during the past few months, suffered a sudden and violent loss from this cause, the need for care cannot be over-emphasised.

Usually, of course, such mishaps are the result of the old business of single-handed starting. Either the throttle is left a little too wide with a brakeless machine, or the switches are accidentally left in the "on" position while blowing out with the throttle wide open. But far less obvious errors can cause a similar, if less expensive, mishap, and I was the witness of one incident in which the runaway carried a pupil with it—the pupil having insufficient experience to cope with the situation. In this case the official reason was given as a faulty switch. Whether or no, there was a very new and expensive aeroplane parked near-by, and the owners and crew nearly suffered heart-failure while the runaway pirouetted around on one wing-tip before subsiding in a cloud of dust.

I had my lesson a fortnight ago when I went through the usual processes for single-handed startment and checked everything with apparent care. After sucking-in I set the throttle a little open for the actual start, which was made on the first pull, and the machine proceeded very slowly to walk along. The brake lever on this particular machine needed a very full movement to be effective, and the brakes did not hold when this was three notches from the full-on position. I had checked the position of the lever by eye alone.

There was little chance that the outfit would have reached a speed of more than a couple of miles an hour in these circumstances, and there was plenty of time to get round to the controls, but, even so, this is the sort of thing which must be guarded against. Aeroplanes are expensive and easily damaged objects. INDICATOR

PRIVATE FLYING

Private Flying

FROM the CLUBS and SCHOOLS

STRATHTAY

FOR the second successive week high winds have seriously handicapped the flying at Perth, only 15½ hours being returned for the week ended September 5. Mr. J. G. Gow has joined as a pilot member.

CAMBRIDGE

Despite the bad weather which handicapped flying on September 11, Marshall's Flying School spent over 67 hours in the air during the week. A first solo was made by Mr. Turner, and Mr. Mitchell obtained his "B" licence.

YAPTON

The excessively high winds made flying difficult at Yapton, but 49 hr. 15 min. were logged for the week, this including cross-country flights to Reading, Hanworth, Brooklands and Cardiff. Messrs. G. C. Davis and J. C. Ward passed their "A" licence tests.

SOUTH COAST

An interesting visitor (now a member of the club) was Mr. Harry Richman, the Atlantic flyer and cabaret star, who was flown over the Downs and Brighton to take a look at the South Coast panorama. The annual dinner and dance is being held at the Grand Hotel, Brighton, on Saturday, September 25.

YORKSHIRE

During the last two weeks of August and the first two of September over twenty-four cross-country flights were made over long distances, and the time spent in the air for that month exceeded 226 hours. A notable visitor to the aerodrome was H.H. the Aga Khan in a D.H. 89. Mr. H. Reid has made a first solo.

HANWORTH

Several of the club's aircraft were flown to Hatfield on Saturday for the finish of the King's Cup Air Race. Lord Louis Mountbatten is renewing his licence and Mr. W. H. Barriedale-Johnson is housing his new Stinson at the club. One first solo was made by Mr. W. A. Edmonds, and Mr. I. Topka completed "A" licence tests. A total of 101 hr. 25 min. represented the flying for the week ended September 11.

LEICESTER

A deputation of the Wolverhampton Corporation visited Leicester Airport on August 12, when they were entertained to tea in the clubhouse by the Lord Mayor of Leicester (Alderman A. H. Swain, J.P.) and afterwards conducted round the hangars and airport buildings. A first solo flight was made by Mr. M. B. Hanford. The club spent 124 hr. 50 min. in the air during August. A dance is to be held in the clubhouse on Friday, September 17.

HERTS AND ESSEX

Flying times for August totalled 349 hours, and during the fortnight to September 11 amounted to 183 hr. 22 min. Mr. J. R. Sweeting went solo, and Messrs. Brymer, Chase, Sweeting and Pemberton completed their "A" licence tests. "B" licence night flights were made successfully by Messrs. Cather, Blackaller, Rogers, Mistry and Byranjee—Messrs. Cather and Blackaller also completing their Hendon tests. Mr. F. C. Pickersgill has obtained his "B" licence.

SOUTHEND

Flying times for the week were fairly good in spite of the rather gusty weather. Mr. A. de Costa completed his "A" licence tests.

MIDLAND

Flying times for the week ended September 10 amounted to over twenty-eight hours, of which thirteen represented dual. Cross-country flights were made to Pershore, Tollerton, Hatfield and Walsall. Mr. Doody has passed his "A" licence tests.

NORTH BRITISH

A somewhat remarkable solo was made at Dyce by Mr. J. Miller, who had only had 3 hr. 50 min. of dual instruction, and Dr. Agnes Thomson also made a good effort. "A" licences were obtained by Messrs. F. Walker, I. McBain, and A. Shepherd.

C.A.S.C.

Members of No. 4 (Kent) Squadron were on duty at Rochester aerodrome for the final day of the Rochester Air Pageant. During the last fortnight members have flown 15 hr. 50 min. at Cambridge and on Sunday a cross-country flight was made to Norwich.

CINQUE PORTS

Several members went to Hatfield for the final of the King's Cup. Flying hours for the week were well up in view of the time of the year and unpleasant weather experienced. Extensive night flying was carried out by Mr. Febo Shetty, who is taking his "B" licence. Two first soloists were Messrs. M. B. Storrs and J. P. MacDonald.

NEWCASTLE

Bad weather—and the King's Cup—made little flying possible throughout the week. There is still hope, however, that last year's record flying hours will be exceeded this year. Mr. E. J. Jobling-Purser and Mr. W. M. Mackay had every sympathy on their bad luck in being forced down so near home with an empty petrol tank during the King's Cup race.

PENANG

The flying times for July again show a great improvement, being exactly 30 hours up on those of the previous month. The total was 166 hours. The Hon. Mr. A. M. Goodman successfully carried out all tests for the Straits Settlements "A" licence. The club was visited by three Vickers Vildebeests from Singapore, and three other R.A.F. aircraft. Three Hawker Audax machines from the Straits Settlements Volunteer Air Force landed at the Aerodrome *en route* for Alor Star.

BROOKLANDS

It is now almost a year since the disastrous fire at Brooklands aerodrome and the rebuilding programme is almost complete. The hangars have been in use for some weeks and now the sales and navigation departments, the engine shops and general offices are arranged in their new buildings. Mr. Ken Waller, who flew the Comet in the King's Cup race, gave a demonstration of the machine to members on Sunday. Major F. C. Maunde-Thompson, who made his first flight in 1911, recently celebrated his sixtieth birthday by having sixty minutes' flying "on the club." He is seriously contemplating entering for next year's King's Cup air race.

Real Dangers

ALTHOUGH Yeovil aerodrome has been temporarily closed for resurfacing (*Notice to Airmen* No. 81) a certain number of pilots have recently landed there. By so doing they have damaged the new surface, to say nothing of running a serious risk of damaging themselves, as the area of work is not clearly marked. The A.A. and R.Ae.C. wish to remind pilots of the fact that Yeovil is really and truly closed for the time being.

At the same time a *Notice to Airmen* reminds pilots of the very definite dangers involved in flying over the Cardington kite-balloon area either by day or by night, or over the Spithead (Norman's Fort) bombing area. A white arrow is displayed on the roof of the Fort while bombing is in progress.

A Party at Rochester

ROCHESTER'S Air Week (now regarded as an annual function) was nicely rounded off last Saturday. The process included a glorious sun, and lunch, tea and a cocktail party for visiting pilots, Captain E. I. Short being responsible for all these arrangements except the first.

Visitors included Miss Lily Dillon, Alex Henshaw (complete with Mew Gull) and Mr. Hordern with the Autoplane demonstrator.

Four Monospars made their entry in formation, and Malling sent a contingent of seven assorted machines. A number of other clubs were represented.

Mr. R. A. C. Brie sat his Autogiro down at the appointed time of 12.59 and was awarded £5. F/O Allen, with a 750-hour Leopard Moth, carried off three guineas for having the best-kept machine, and the Malling Aero Club were runners-up with a 1929 Gipsy Moth.

So many private aircraft had never before been seen at Rochester, and Capt. Milward, in control, had a busy time.

Luton to Littorio

SOME further details are now available regarding the recent Italian Littorio Rally, in which seventy-six aircraft took part, representing by their manufacture nine different countries. Thirty-nine were Italian, eleven German, eight British, five Czech, four French, three Polish, and two each Belgian, Austrian and Hungarian.

As already reported in *Flight*, the Rally was won most handsomely by Signor Parodi in a Percival Vega, in which the only modification from standard was to enable it to carry a complement of five for the purpose of the event! The engine was a Series II Gipsy Six with D.H. v.p. airscrew, and the machine completed the circuit at an average of 163.4 m.p.h., to score 387 marks more than the next best competitor. Of the seventy-six starters, fifty-two finished.

The Cygnet's Power Unit

IN last week's description of the King's Cup machines the C.W.A. Cygnet should have been described as having a Gipsy Major engine.

SOARING in DERBYSHIRE

The Competitions at Great Hucklow : Amazing Cross-country Flying

THAT a total of 270 hours' soaring was put up during this year's national soaring competitions at Great Hucklow, Derbyshire (as compared with 150 hours at last year's meeting), may be regarded as merely the result of evolution. But that 1,488 miles of cross-country flying were carried out is a phenomenon requiring another explanation.

This spectacular result may be attributed partly to the way in which the Government subsidy to gliding has aided the better equipment of soaring sites in various parts of the country, and partly to the new system, introduced for the first time this year, of awarding points for all performances above a certain minimum. Points were only awarded for duration flights of more than two hours, climbs of over 1,500 ft., and distances exceeding 15 miles—or 20 miles if the going was good, as determined by the best performance of the day. Competitors were thereby encouraged to improve their daily position.

Twenty-three machines were entered; only three were of foreign construction, and of the British designs the Kirby Kite, of Slingsby Sailplanes, was the most popular with six examples present. Thirty-eight pilots entered their names.

The first day of the meeting, August 29, demonstrated how members of the leading gliding clubs are no longer dependent on winds blowing up slopes in order to soar. There was almost dead calm, yet over nine hours' soaring was done, seven pilots got up to cloud level, and two went off on short cross-country flights. Thermal currents rising from the launching ground did the trick, with the help of a launching winch provided with 3,500ft. of cable, which pulled the machines up to heights varying between 500 and, in one case, 1,250ft. For a period of two hours in the morning and another of 1½ hours in the afternoon, there appeared to be permanent thermal lift all over the site at heights between 1,000 and 3,000ft., but the actual take-off of the thermals from ground level appeared to be only periodic, and not all pilots could catch them at the right moment.

Goal-Flying

After a day and a half with the competition site in the clouds, an afternoon with south winds blowing up Eyam Edge enabled 34 hours of soaring to be done, but there was an entire lack of thermal currents.

Wednesday, September 1, was another "stable" day without thermal currents, but a good wind enabled over 62 hours of slope-soaring to be done—a record for a British site in one day. Most of this was done in the afternoon, for although flying began as early as 7.20 a.m., the cloud base was so near the hill-top all morning that not more than two machines could safely be allowed up at a time. The longest duration flight of the meeting, one of 7½ hours, by L. R. Robertson, was done on this day.

On Thursday cross-country flying began in real earnest when J. V. Rushton took off at 10 a.m. in a Grunau Baby and in nine minutes was lost to view under a cloud street which stretched away to Sheffield in the north-east. Little more than an hour later he had landed on the Yorkshire coast just north of Withernsea, 76 miles away. Fourteen other pilots got away, and nearly all of them used the long-belts of up-currents under cloud streets. Three, in addition to Mr. Rushton, reached the coast. J. E. Simpson, in a Kirby Kite, also landed near Withernsea, while J. P. Dewsbery, although flying the Rhönsperber more or less down wind, at the time worked his way northwards across wind and was thus able to travel 83 miles before reaching the sea. P. A. Wills, on the other hand, tried to prolong his distance by working southwards, giving Skegness as his goal, but the high wind took his Hjordis sailplane to the coast so fast that he had to land considerably farther north, at the North Coates R.A.F. aerodrome, having flown 75 miles.

The idea of encouraging a pilot to announce the goal at which he is aiming before setting out on his flight was another innovation at this year's meeting. If a landing was made at the declared goal, he received a thirty-three per cent. addition to any marks he earned on the flight. It requires a nice judgment to decide on a suitable goal, for the pilot must guess just how far he is likely to get before the thermal currents die out in the late afternoon or become too sparse for him to bridge the gap from one to the next. If he arrives over his goal several thousand feet up, he may find it more profitable to fly on, but will thereby sacrifice the extra points given for a goal flight. Of the ten pilots who announced definite goals on this day, only two landed upon them; two went beyond and the rest fell short. The successful ones, E. J. Furlong and S. C. O'Grady, landed respectively on Doncaster and Finningley (R.A.F.) aerodromes.

The aggregate straight-line distance covered during the fifteen flights was 670 miles. Never before in this country has anything approaching such a total been achieved; the nearest thing to it was the 450 miles of cross-country soaring done by members of the London Gliding Club during a whole week this August.

After this terrific day, cloud streets, though still present in the sky from mid-morning till late afternoon, gradually deteriorated in quality from day to day. On Friday, September 3, there were 17 cross-country flights totalling 481 miles. The farthest distance was achieved by P. A. Wills with a very fine goal flight to Great Driffield, 72 miles away. C. Nicholson, in the Rhönsperber, tried for the same goal and landed only six miles short at Leconfield aerodrome. L. R. Robertson, flying 56 miles to Winteringham on the Humber, went nearly twice as far as his modestly declared goal at Doncaster.

Outstanding Cross-Countries

Saturday saw 317 miles of cross-country flying by ten pilots. K. Lingford, having declared for Doncaster, only thirty miles away, flew 80 miles to Easington on Spurn Head, in contrast to a pilot who gave Skegness as his goal and landed at Doncaster, having started two hours later and missed the best of the lift. Another outstanding flight was again that of P. A. Wills, who, for the third time in three consecutive days, flew a distance of over 70 miles. He had the advantage of being able to get back in time for a good night's rest between each flight, since his wife has such confidence in his ability to reach his declared goal that she sets out for it with car and trailer without waiting to hear whether he has got there. This third flight, like the first, ended at North Coates. During it Mr. Wills went into the clouds and climbed to 6,000 feet above his take-off, or more than 7,000 feet above sea level, a feat which would have won him not only the height prize but also the De Havilland Cup for the greatest height of the year were it not for the unfortunate fact that his barograph failed to register after the first 2,000 feet.

Mr. Wills received the Manio Cup for the longest goal flight of the meeting; he also gets the Wakefield Cup for the longest flight of the year, that of 98 miles from Dunstable to Dover on August 15. Further, his Hjordis sailplane earned for him the chief prize of the meeting for the greatest aggregate of points earned—477. The second prize went to the

This striking photograph of Bradwell Edge shows, down below, the factory chimney known to pilots as the "thermal indicator." Its smoke indicates the presence of a thermal current rising from the valley. When this picture was taken the competitor in the Grunau Baby was struggling to maintain his height.

Rhönsperber sailplane flown in turn by R. P. Cooper, C. Nicholson and J. P. Dewsbery, and the last was awarded also the prize for the longest distance flight of the meeting—83 miles. The height prize and the De Havilland Cup are not yet awarded, pending the examination of barograph records. An open contest for machines entered by teams of pilots was won by K. Lingford and J. E. Simpson with a Kirby Kite, and one for individual entrants by P. A. Wills with his Hjordis.

The most exciting contest of all was one between five club teams, with one machine and three pilots each, for a challenge trophy offered by Dr. L. Du Garde Peach, of broadcasting fame, who lives in the district. By Tuesday night four of the clubs had only about twenty points each, and the London Club none. R. P. Cooper put this right by getting into the air soon after 7 o'clock next morning and staying up till lunch time, earning thirty-two points, but by the evening L. R. Robertson's 7¼-hour flight had put the Derbyshire and Lancashire Club, on whose site the competitions were being held, well ahead with 69½ points. After this, the three good cross-country days enabled the Rhönsperber, entered on behalf of the London Club, to draw ahead, and it finished easily in the lead with 408 points. Derbyshire and Lancashire came next with 239, with Cambridge University close behind with 212½; the Newcastle team earned 180 and the Midland team 145 points.

A. E. S.

An Exhibition at Lima

A SO-CALLED Inter-American Technical Air Conference is to be held in Lima, Peru, from September 16 to September 23. Representatives of all the countries in North, Central and South America will take part in the Conference, and the different countries have been invited to send squadrons of aeroplanes. The close of the Conference will be solemnised by the unveiling of a monument to Jorge Chavez, the Peruvian pioneer who lost his life after a flight across the Alps in 1910.

In connection with the Conference an International aero show will be held in the new building of the Ministry of Public Health, which will be inaugurated at the same time.

Rolls-Royce Research Fellowship

IN memory of Sir Henry Royce, the Board of Rolls-Royce, Ltd., have decided to found a Travelling Research Fellowship to be known as the Henry Royce Fellowship.

The Fellowship, not exceeding £450 per annum and tenable for one year, will be offered annually to any graduate of a British university, or holder of the Higher National Certificate or other qualification regarded as equivalent by the directors of Rolls-Royce, Ltd. The holders will be required to pursue a course of advanced study or research at home or in the Dominions or the United States, or in other foreign countries.

This study may be pursued in a university or technical college or in a works, and is to concern the construction, design, materials or method of production of automobile transport, including applications to aircraft and modern engineering.

Candidates must be British subjects of at least twenty-one years of age. Full details are obtainable from Rolls-Royce, Ltd., Derby.

FASHION NOTE FOR THE SERVICE: Mr. Leslie Irvin, of parachute fame, has been seeking an alternative to the present electrically heated kit used for high altitude work in the R.A.F. He is seen wearing the result—the "Irvinsuit," made of thick soft leather lined with inverted lambskin. The helmet, jacket, mittens and trousers all make special cold-proof seals with one another, and Zipp fasteners down the legs of the trousers simplify donning and doffing. It is stated that the suit was tested for one hour by an enthusiast sitting on a gun ring in a temperature of -40 deg. F., and a subsequent medical examination showed him to have been unaffected. The suit has been ordered in quantity for the R.A.F., but it will be available for club pilots and private owners who remain faithful to the open cockpit. (*Flight* photograph.)

A good impression of the T.K.4, piloted by Bob Waight, getting its tail skid off Hatfield Aerodrome at the start of the King's Cup Eliminating Race on Friday. (*Flight* photograph.)